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THE IRON AGE

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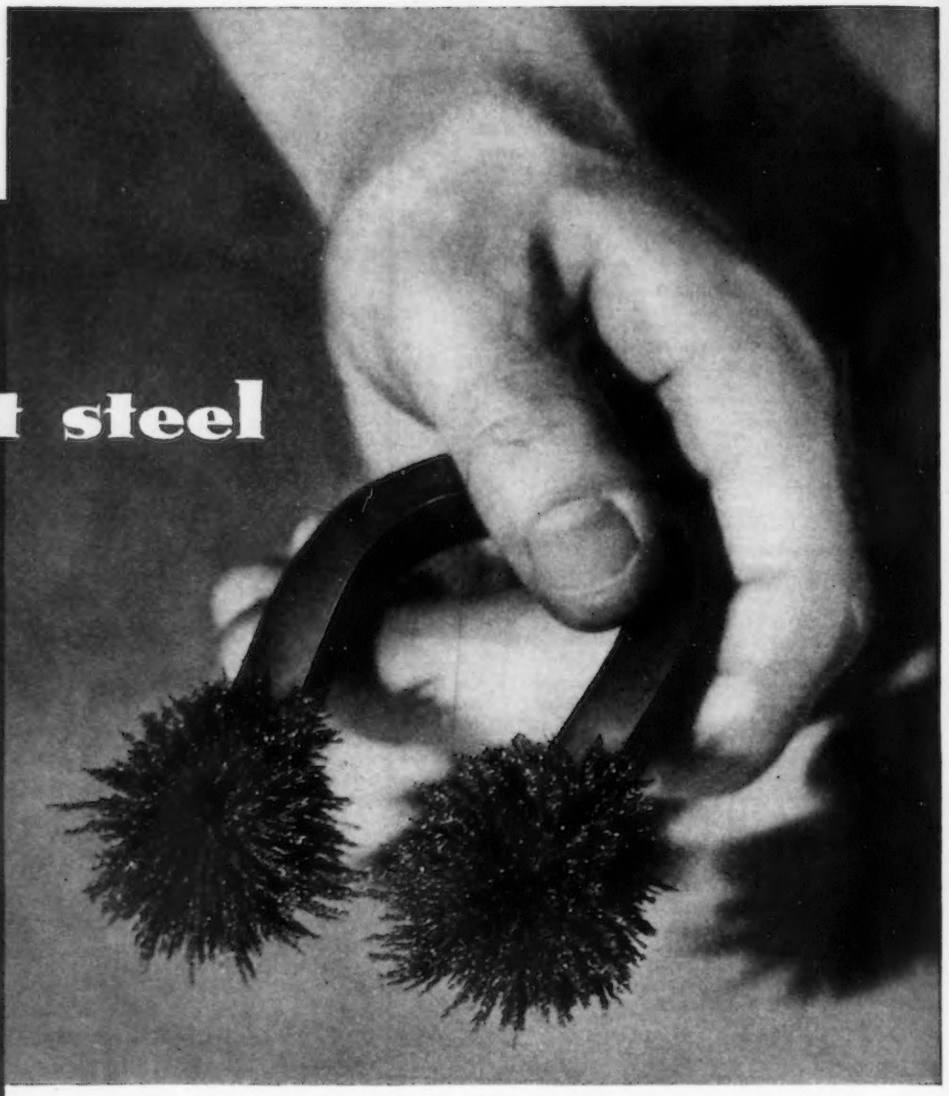
SEPTEMBER 8, 1938

A magnet steel made in the open-hearth



An example of Bethlehem service to users of special steels

IT MAY sound like heresy to some, but Bethlehem makes magnet steel in the open-hearth furnace, as well as by more expensive processes. We have done so for years and have perfected methods such that the lower-cost open-hearth steel fully meets the requirements for many purposes.

The foremost consideration is that open-hearth magnet steel offers a big advantage in cost. Less tangible, but still very important to many users of magnet steel, is the uniformity. Being produced in large furnaces, 70 to 80 tons of finished bar stock are obtained from a single heat.

Whatever kind of special steel you may use, the chances are that Bethlehem can offer you something worth considering, either in service qualities, processing properties or cost.

In the Bethlehem organization all metallurgical problems are handled in a central metallurgical division. This provides for applying all of the experience obtained in contacting all industries to the task of making the best steel for any particular purpose. A unique system of control provides the means for consistently meeting highly specialized requirements.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

... THE IRON AGE ...

SEPTEMBER 8, 1938

ESTABLISHED 1855

Vol. 142, No. 10

The Job He Never Had

Uniontown, Pa. — Richard Lee Malone, seven year old farm boy of near here, has received a WPA dismissal check for $6.54 for 13 hours work he had never done. Three local WPA officials, including Lyell L. Buttermore, head of the WPA for Fayette, Green and Washington counties, approved the dismissal. The lad's parents said they felt the seven year old boy, who was listed as a laborer, should not leave school to join the WPA.

From the News

THE IRON AGE • 239 WEST 39TH STREET • NEW YORK, N.Y. • PHONE-PEnnsylvania 6-1100 • A CHILTON PUBLICATION

Sept. 8, 1938.

Dear Dick Malone:

You did right in turning down that job as a WPA laborer. After all, you are only seven years old, and in this country a boy of seven is considered too young to carry either a rifle or a WPA shovel - even if he is big for his age.

You have been fired from a job which you never had - perhaps the first job you never had - but grown men have been dismissed from jobs that they did have, and often when they had larger families to support than yours.

And you have a number. The notice telling you that you were dismissed because you failed to report for work as a WPA laborer for five days called you:

"Identification 4426-58632"

By the size of that number, son, you can't be the only boy fired from the WPA for failing to report for work. So don't feel badly even though you are also known as Case No. 19344-51 in the warning that you had better report for work or else.

These are formidable numbers for a boy to be carrying around when he should be picking thistles out of his feet and lying on his back looking at the stars. Or watching the sun reflected from a cow's back after a rain. Or smoking one of those long cigar-like things that hang from catalpa trees. Or sitting on the banks of the Monongahela waiting for another coal tow to Pittsburgh.

For this one brief moment, Dick, you might be called a failure. The Government itself has listed you as a boy who wouldn't go to get a WPA shovel. Yet when you start out to look for your second job some 10 or 15 years from now, I know that your WPA record will not be held against you. By the way, if you keep that WPA dismissal check, I don't believe anyone would mind.

Your friend,

J. H. Van Deventer

Electric-Furnace Brazing: Where

EACH of the various established methods of fabricating metal assemblies or parts has its field of economic application. That of electric-furnace brazing, a comparatively newcomer in the list of available processes, is here indicated by Mr. Webber by means of a number of actual applications.

The article begins a comprehensive series which tells how, as well as where and why, this production brazing process may be advantageously employed. Most of the data is of a practical nature, and all of it is of value in effectively applying the process.

Articles to follow will cover methods of holding assemblies together and supporting them in the furnace; an explanation of capillary attraction and wetting action; limiting the creep of brazing metal; and removing the copper from steel surfaces after brazing. Also, selecting and applying the brazing metal and selecting the flux, if needed; and the venting of hollow bodies. An installment explaining the great strength of furnace brazed joints will include data on the effects of tightness of fits and time in furnace and the effects of heat treatment. The furnace brazing of cast iron will also be discussed and a brief article will be devoted to furnace equipment.

The assistance of W. E. Edwards, Refrigerator Department, and F. C. Kelley, Research Laboratory, General Electric Co., and many others who generously contributed to make this series of articles possible, is gratefully acknowledged by the author.

o o o

THERE are a number of well established methods of fabricating or forming metal assemblies or parts which we all use in the manufacture of our products, most of which we could not well do without. Different methods are used for different products because of certain requirements involved. Each particular method has certain manufacturing advantages for its job which other methods cannot give. Usually the method employed is the one which gives the lowest overall cost for making and servicing the product, all factors considered.

Electric-furnace brazing has taken a definite place among these various methods of fabricating assemblies and forming parts. Where it has been adopted it too has been found to give certain benefits obtainable in no other way. In most instances its use has brought improvements in quality. In practically every case it has resulted in a reduction in the cost of the product, either in manufacture, inspection, or servicing, or in a combination of the three. Usually, when the furnace-brazing process has been adopted, it has (1) replaced some other method; (2) it has been used to augment a former method, or (3) a new product has been developed which would have been impossible or difficult to make without the furnace-brazing process. One can best visualize where and how to apply electric-furnace brazing by actually seeing illustrations of production jobs falling in these three groups.

Does Not Supplant Other Methods

In reviewing the various applications to follow, the reader is asked to keep in mind that there is no intention of "defaming" well established methods, nor to convey the thought that electric-furnace brazing has come upon the scene to replace every modern means of fabricating metal assemblies or forming parts. The uses of electric-furnace brazing do overlap these other methods, however, and in many cases this process gives benefits obtainable in no other way. It is the purpose of this series of articles to show where and why furnace brazing has been successful, and to give practical suggestions on how to use it.

Automobile and refrigerator manufacturers, or their parts manufacturers, make up a large portion of the present list of users of electric-furnace brazing, perhaps because of the dominance of these industries in the metalworking field. To them, great strength in the joints is paramount, but in addition they are attracted by the tightness, uniformity, and excellent appearance of furnace-brazed sub-assemblies. The simplicity with which complicated shapes can be fabricated, cleanliness of the work as it comes from the brazing furnace, and good cost reductions are important advantages. Practically every automobile made today contains several furnace-brazed parts, as do many brands of refrigerators. This also holds true for many of the leading adding machines, accounting machines, cash registers, typewriters, radio receiving sets, and sewing machines.

Process Described

In the electric-furnace-brazing process, assemblies are put together with brazing metal, in some such form as wire, applied near the joints to be brazed. The assemblies are then passed through an electric furnace in which a reducing atmosphere prevents the metals from oxidizing, frees the metals from any oxides present, and thus prepares the surfaces of the parts to be wetted by the molten brazing metal. Then, when the brazing metal

and Why to Use It

By H. M. WEBBER
Industrial Department,
General Electric Co., Schenectady, N. Y.

melts, it creeps on the surfaces of the parts and is drawn into the joints by capillary attraction, and forms alloys with the body metals. Upon transfer of the work to an adjoining controlled-atmosphere cooling chamber, the alloys when solidifying develop great strength, and the assemblies cool down to a temperature at which it is safe for them to come in contact with the outside air without danger of discoloration due to oxidation. In this manner, the assemblies are delivered from the furnace with strong, tight, joints and clean, bright surfaces.

Fig. 1 shows the manner in which a typical assembly is prepared for electric-furnace brazing, and how the brazing metal flows through the entire tight joint, forming a strong film of alloys with the body metal. At the left in this illustration a copper-wire ring is shown placed around a joint between a piece of steel tubing and a steel stamping to be brazed. At the right, after furnace brazing, smooth, neat-appearing fillets of copper are evident at the extremes of the joint, having formed due to the surface tension of the molten copper. The strong uniform film of alloys within the joint is also shown. At this point it is interesting to observe that the strength of the bond can be controlled by providing the necessary area within the joint to give the total strength desired.

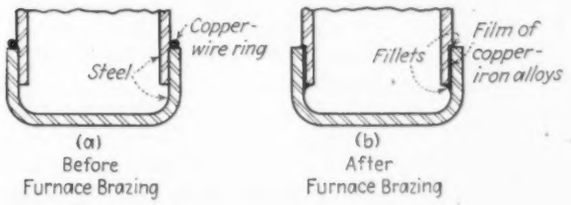


FIG. 1 — Assembly before and after electric-furnace brazing.

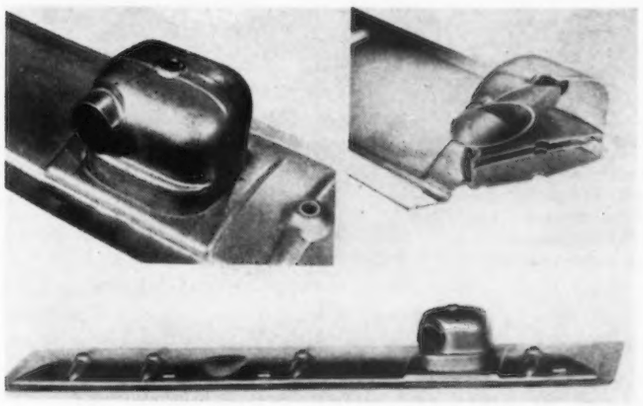


FIG. 2 — Push-rod cover for Buick automobile engine, copper brazed in roller-hearth conveyor-type furnace.

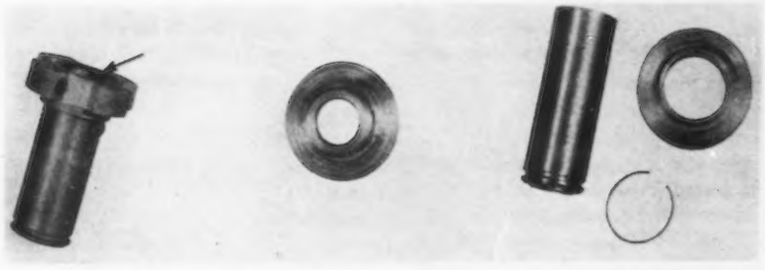


FIG. 3—Over-running clutch cam formerly machined from bar stock but now made of two inexpensive parts copper-brazed in electric furnaces.

Reasons for Using Process

Various manufacturing processes for which electric-furnace brazing has been substituted are torch brazing, dip brazing, soft soldering or sweating, riveting, pinning, welding, machining from solid stock, casting, and forging. When electric-furnace brazing has been adopted to replace or augment such methods, this generally has been because there were certain objections to the other methods for the job under consideration, among which might be found the following:

1—Low strength—parts work loose in service.

2—Non-uniform strength — uncertain service life.

3—Oxidized or flux-covered surfaces—subsequent cleaning required.

4—Distortion from localized heating—subsequent straightening or machining required.

5—High cost of forming—machining, patterns, molds, dies, etc., required.

6—Low production rate—relatively slow manual operations.

Where electric-furnace brazing has been applied, it has generally given

one or more of the following benefits for the reasons cited:

Benefits from Electric-furnace Brazing	As a Result of
1—Increased life of subassemblies and reduced service costs.	Great strength and resistance to vibration and impact.
2—Reduced production costs.	Savings in time, materal, weight, space, rejections, and inspection.
3—Strength at high temperatures.	Copper used as brazing metal, having high melting point. It also has good heat conductivity.
4—Uniform tightness.	Uniform distribution of brazing metal, through accurate control of quantity applied, time, temperature, and furnace atmosphere.
5—Little or no distortion.	Freedom from localized strains.
6—Excellent appearance.	Clean, bright surfaces and smooth fillets at joints.
7—High production rate.	Ability to braze many joints in each assembly at one time. High production per operator.
8—Flexibility.	Ability to braze light parts to heavy ones. Unlike metals can be joined, such as copper to steel, or high-carbon steel to low-carbon steel.

To best illustrate how these benefits have actually been obtained, specific illustrations follow, showing where the furnace-brazing process has been adopted in production to replace or augment other methods. These new uses of furnace brazing will be classified, for the sake of simplicity, according to the former method used.

Formerly Torch Brazed

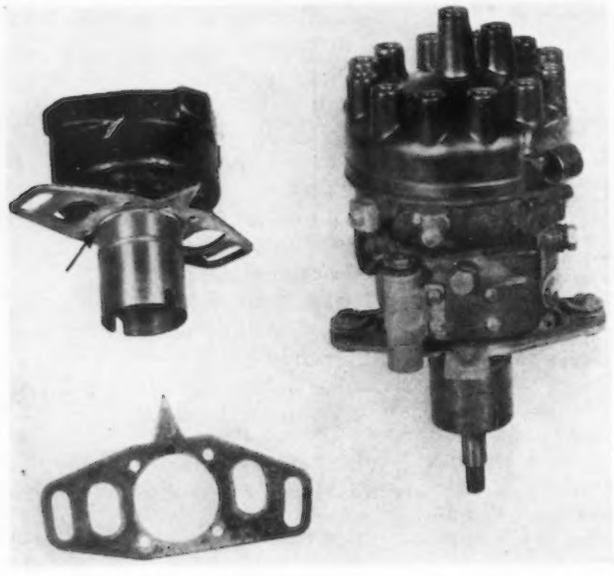
The first example is the sub-assembly shown in Fig. 2 which is the push-rod cover for the Buick automobile. The joint between the tube and the breather box was formerly torch brazed, and additional operations were required to secure the other parts of the assembly in place. Now that furnace brazing is used, all of the joints are bonded together in one mechanical operation rather than by several manual operations, and the assemblies come from the furnace free from flux and oxides, with clean bright surfaces. Other benefits are improved uniformity, greater strength, and lower cost.

Formerly Machined From Solid Stock

In a number of cases large cost reductions have been made by substituting the electric-furnace brazing of component parts for the machining of an object from solid stock. The cost of setting up, machining, and waste material is sometimes appreciable, particularly when compared with the low cost of punchings, stampings, or screw-machine parts which can be assembled together with tubing or standard bar-stock and furnace-brazed to form inexpensive assemblies having ample strength.

Fig. 3 shows an over-running clutch cam, copper-brazed in electric furnaces by the Delco-Remy division of General Motors. This assembly was formerly made in one piece from bar stock, which required an expensive machining operation and waste of material. Now it is made from two pieces of S.A.E.-4620 steel, pressed together with a copper wire ring around the joints and brazed in mesh-belt furnaces. The results are uniformly high quality and reduction in cost.

Drilling operations have been eliminated in the manufacture of steam plate molds for pressing phenolic resins, by building up the molds from plate and bar stock and furnace-brazing them, instead of boring steam paths through solid blocks of steel. By this improved method, which has been used several years by such companies as the National Cash Register Co. and the General Electric Co., the molds are made with greater internal heat-transfer area, resulting in faster operation and greater output.



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AT LEFT

FIG. 4—Cast iron distributor bowl and steel advance-arm assembly, formerly riveted, now furnace brazed for greater strength.

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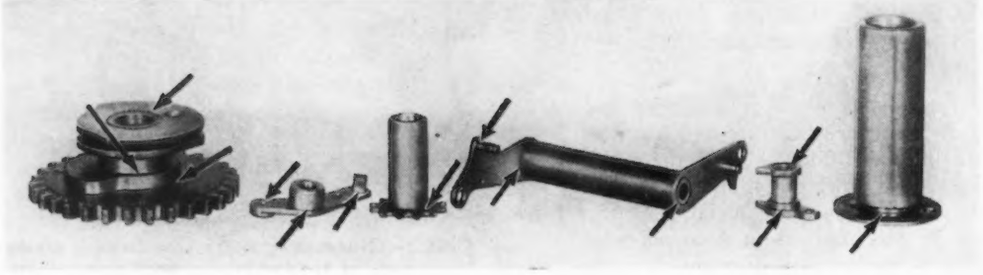

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AT RIGHT

FIG. 5—Copper-brazed steel sub-assemblies for cash registers.

o o o

Formerly Riveted

The Delco-Remy distributor bowl and advance arm assembly, Fig. 4, was formerly made by riveting the punched-steel advance arm to the cast iron distributor bowl. Under some types of heavy duty service, the rivets became loose. Now that the assembly is furnace brazed, using brass as the brazing metal, it has ample strength and long life.

Formerly Pinned

Seven of the leading business-machine manufacturers are now using the electric-furnace brazing process in the fabrication of sub-assemblies such as shown in Fig. 5. The working parts of cash registers, adding machines, bookkeeping machines, postage meters, typewriters, and the like, operate several million times during their lives, and are consequently subjected to severe stresses, impacts, and vibration. It has been found that electric-furnace brazed sub-assemblies have many times the strength of similar fabricated parts made other ways, such as by pinning or riveting; they never work loose, and they save considerable money in the reduction of both production and service costs. Most of the brazing-furnace installations for this class of work have paid for themselves within a few months time.

Comparative strength tests have been made on numerous parts to determine relative strengths obtained by the old and new methods. The data in the accompanying chart, Fig. 6, are typical. Note that ultimate strengths of typical steel assemblies formerly pinned or riveted, now electric-furnace brazed with copper, have been increased 52 to 287 per cent. This means that the parts have longer life, and they can be built with lighter and smaller sections, thus reducing inertia and space requirements.

The copper-brazed parts withstand repeated impacts better than those pinned or riveted together. For example, in a severe accelerated test which gave 800 blows per min. on a certain cash register sub-assembly, feather-pinned levers had an average life of 1,400,000 operations. On a copper-brazed lever, the test was stopped after 5,300,000 operations as there was no sign of failure.

A similar accelerated test on another part gave an average life of 4,500,000 operations for drilled and pinned levers. Corresponding parts with copper-brazed joints failed in places

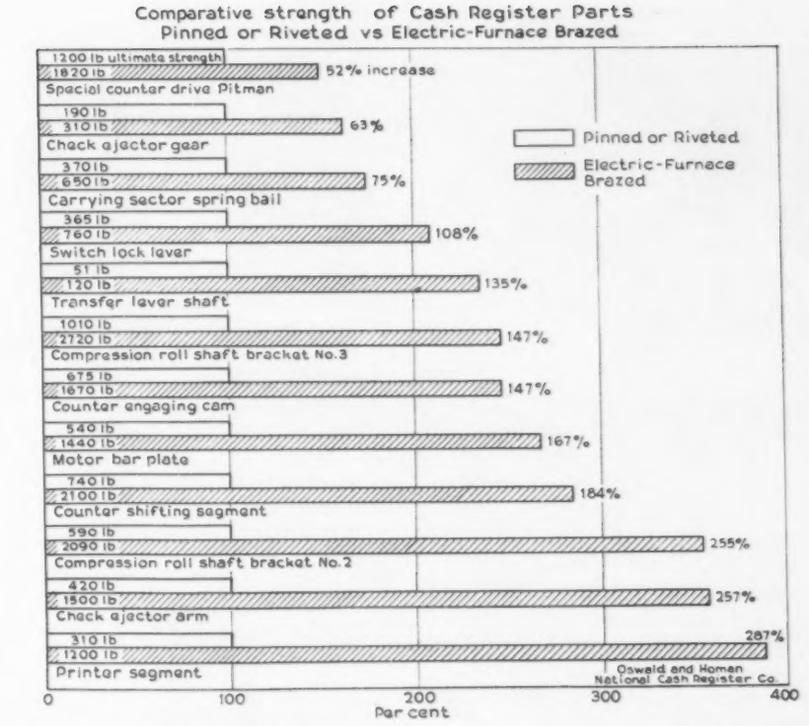


FIG. 6—Chart, made from the results of tests on cash register parts, shows the comparative strength of pinned or riveted vs. electric-furnace brazed parts.

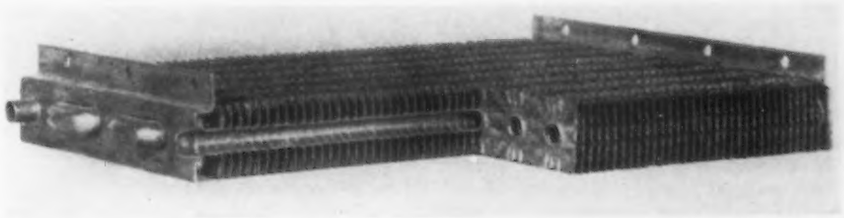


FIG. 7—Steel-fin condensing unit made up of cupped fins telescoped together. This assembly has 729 joints, all copper brazed in a single trip through a continuous furnace.

other than the joints after 9,800,000 operations.

Cost savings effected by use of the electric-furnace brazing process run in general from 30 to 90 per cent of the former costs when drilling and pinning the cash-register assemblies. Actual savings vary from $0.40 to $10.00 per hundred pieces.

Formerly Soft Soldered or Sweated

Fig. 7 shows a copper-brazed steel fin condenser for refrigerators. The fins are cupped and punched from strip steel and the stampings are then pressed together, forming tubes within themselves. No tubing is used in these units except for the two short connectors on one end. Condensers of this type are built to withstand service at high temperatures and high internal pressures. Similar units were formerly made by dipping in a bath of soft metal and sweating the joints. Obviously they were limited in their application because of the low melting temperature and low strength of the bonding metal. The copper-brazed steel-fin condensers have proved to be very successful and are being used by some of the largest refrigerator manufacturers.

Copper wires are placed inside the built-up tubes during assembly of the condensers, and copper plating on the strip steel used for the fins provides an auxiliary supply of brazing metal. The accuracy with which these condensers can be assembled and brazed without leaks is amazing. Each condenser contains a great number of joints, sometimes several hundred. For instance, that shown in Fig. 7 has 729 joints. In a typical production lot where there were 660,000 joints, only 12 leaks were found in a production test under water with internal air

FIG. 8—Bushing support for oil circuit breaker, furnace brazed with silver-brazing alloy and flux.

pressure of 275-300 lbs. This can be expressed in percentage as 99.999 per cent good joints. Even those few leaks which were found were patched with a torch. This is only one of a number of examples where the furnace-brazing process gives good uniformity of quality.

Welding

Welding is today a widely-used method of metal fabrication, and its uses are continually multiplying. Electric-arc, spot, seam, flash, and projection welding are some of the modern methods which have helped to improve quality, speed production and cut costs.

Electric-furnace brazing, though not as widely used, goes hand-in-hand with welding for some classes of work. Both processes are frequently studied when considering new fabricating problems, to determine which will best meet the many requirements. Sometimes a product formerly welded can be furnace-brazed to advantage, or vice versa.

Fig. 8 shows a bushing support used in G-E oil circuit breakers, formerly made of bronze tubing welded with bronze to either a steel or a bronze flange. With the electric-furnace brazing, no machining is required after brazing, an exceptionally neat fillet is obtained, the sub-assemblies are of uniformly high quality, and a single unskilled operator can braze several times the quantity formerly welded by one man. It is conservatively estimated that economies from adoption of the process paid for the brazing-furnace equipment in less than two months' time.

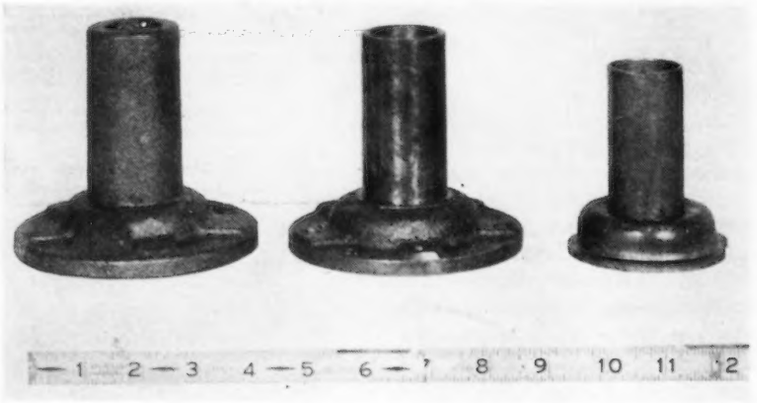
The bushing supports are now made of brass tubing with either a steel or brass flange instead of bronze. This effects a saving in the cost of material. The brazing metal is a wire ring of Easy-Flo silver brazing alloy made by Handy & Harman. "Handy" flux in paste form is applied on the wire and on the brass tube near the wire. The parts are given a wash and bright dip after they leave the furnace.

FIG. 9—Metal-envelope vacuum tube parts (at left) are copper brazed to supplement spot welding.

Electric-furnace brazing is being used to supplement spot welding in a number of instances. The metal radio tube, Fig. 9, is one example, in which eyelets are spot welded into the headers and shells. The assemblies are then copper brazed in electric furnaces to assure vacuum-tight joints.

Formerly Cast or Forged

Fig. 10 shows a malleable cast-iron clutch-gear bearing retainer which has been replaced by a furnace-brazed assembly for the Buick car. The malleable-casting, *A*, weighed 2½ lb., and when machined, *B*, weighed 1½ lb. The furnace-brazed assembly, *C*, which replaces it, weighs only ½ lb.,



A B C

FIG. 10—Buick clutch-gear bearing retainer. Formerly made from a malleable casting, as shown at A and B, it is now a furnace-brazed assembly C, consisting of a piece of steel tubing and a stamping.

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FIG. 11—Fan-belt pulley made of two stampings and one screw-machine part and furnace brazed. It was previously made from cast iron.

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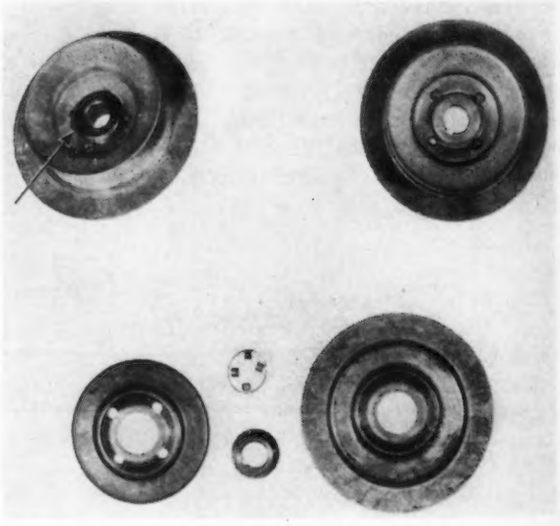


has great strength and low cost. It is made of a piece of steel tubing and a stamping.

The Delco-Remy fan-belt pulley, pictured in Fig. 11, is made from two stampings and a screw-machine part; it was formerly made from a gray-iron casting. In addition to great strength, lightness, and low cost, the furnace-brazed pulley features inherent balance, thus avoiding the balancing operation formerly necessary with the cast-iron pulley. As generators equipped with these pulleys operate at speeds as high as 9000 r.p.m., balance is an important factor. The brazing metal is supplied in the form of a ring and four slugs, made from copper wire.

Fig. 12 shows a furnace-brazed track link for track laying vehicles, such as tractors, formerly made of forgings. The service to which these links are put is extremely severe. The furnace-brazed assemblies have great strength and are lower in cost. One important item in the cost reduction is the substitution of tubing for the solid members which formerly were drilled. Other methods of fabrication have been tried but furnace-brazing has shown itself far superior from the standpoint of high strength and uniformity of strength in the joints.

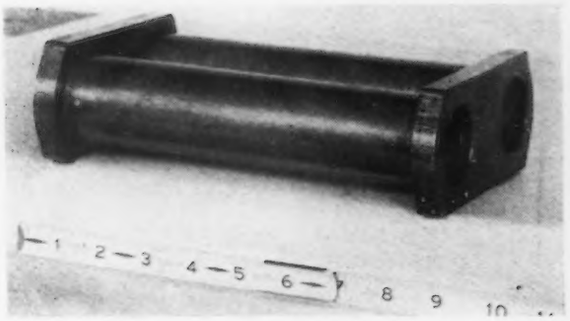


FIG. 12—This copper-brazed track link, for track laying vehicles such as tractors, is subject to severe service. An important saving is made in substituting tubing for former solid members that required drilling.

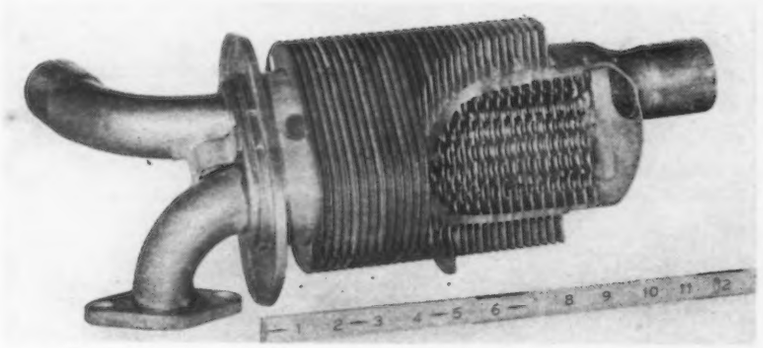


FIG. 13—Core, with part cut away, for automobile hot-air heater. It is made of steel stampings and tubing, and 65 joints are copper brazed.

New Products Through Furnace Brazing

Electric-furnace brazing has made possible the development of a number of completely new products, which would be difficult or impracticable to make any other way. The automobile heater core shown in Fig. 13, made by the Novi Equipment Co., Novi, Mich., is typical.

These heater cores are made of steel stampings and tubing, copper brazed together. After brazing, sheet-steel jackets are assembled around the cores to provide a chamber through which air is forced. Exhaust gases which pass through the cores, on the way from the engine to the muffler, give up their heat to the inner shell. This heat is picked up by the air passing over the shell and is then carried into the car for warming purposes. The core has fins inside the shell as well as outside, and there are shoulders on the fins to give proper spacing. Copper-brazed joints between the fins and shell give good heat transfer. Those at the ends are tight and strong. Quick heating, and delivery of heat in great quantities, are the outstanding advantages of this type of heater.

FIG. 14—Shock-absorber brackets for Buick cars are required to withstand severe stresses. A screw-machine part is pressed into a stamping and the assembly furnace brazed.

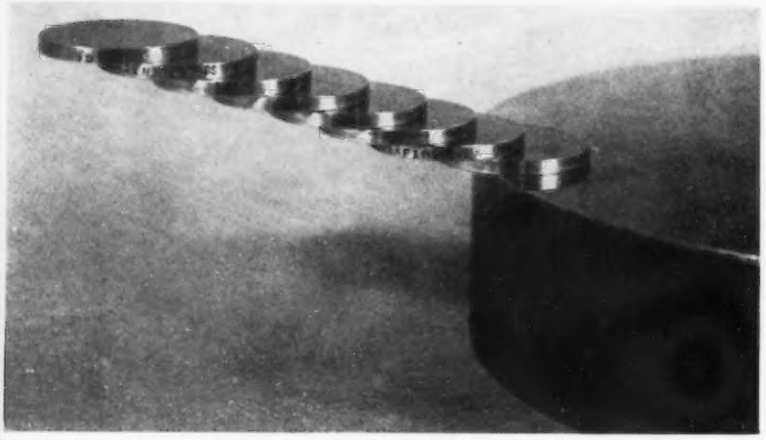
A new Buick furnace-brazed subassembly is the shock-absorber bracket shown in Fig. 14. These brackets are fastened to the frame to support the rear shock absorbers. They successfully resist severe impacts and bending stresses. Each bracket consists of a screw-machine part pressed into a stamping, with a copper-wire ring at the joint supplying the brazing metal.

(To be continued)

Carboloy Training Schools Are to Be Resumed

THE "schools" conducted by the Carboloy Co., Detroit, since 1937 will be continued this fall. The courses are conducted either in local Carboloy offices or in the plants of Carboloy users. They consist of a four to six-hour session devoted to the practical use of Carboloy and are available without charge. Subjects include the economics, design, and application of Carboloy tools; and the making of single-point, multi-point and form tools.

Discussions are supplemented by charts designed to clarify important design and application features. When time permits, actual shop work in brazing tips to shanks, grinding, and the salvaging of tools made up for certain jobs but not completely consumed is included. The course is adaptable to presentation before technical societies, foremen's clubs and similar groups. Arrangements can be made through the company at 2995 East Jefferson Avenue, Detroit, or through any Carboloy representative.



"JO BLOCK" accuracy and flatness of finish accomplished by the Superfinisher is well illustrated by this offset stack of disks, apparently defying Newton's Law.

The Development of Chrysler's Superfinish—II

o o o

By WILLIAM F. SHERMAN
Detroit Editor, The Iron Age

o o o

ONE of the first uses of Dr. Abbott's Profilometer was to support the contention that when all traces of grinding marks are removed down to base metal, the brinelling of roller bearing races was eliminated. (See first part of this article, Sept. 1 issue, page 18.) No mirror-like appearance was obtained inside the bearing races or on the crankshaft by the process which actually gave the most perfect finishes. Instead, there appeared to be a myriad of minute scratches. Later developments indicate that when there is a mirror effect, it generally is produced by the very small helix angle left by tool marks. The fallacy of considering the bright surface a smooth one is also demonstrated by a comparison of a really smooth surface with any bright-looking or mirror-like object. The smoother of the two appears almost dead black. In other words, the fewer lines, scratches or other defects there are to reflect light, the less shiny will be the appearance.

The experimenters had solved the vital problem of measuring surface finish and classifying the results of various machining methods. As understanding of the meaning of surface finishing became more clear, the subject took on new aspects which led naturally to attempts to break down the subject of surface finish and to obtain complete knowledge of the fundamentals involved.

IN the second part of the series, which began in the Sept. 1 issue, the author presents some fundamental new conceptions and definitions of terms relating to Superfinishing. Numerous charts summarize the experience of the Chrysler Corp. to date in the use of this technique as compared with conventional methods of finishing automotive parts. The third article will deal with measurement of temperatures on metal surfaces, hardness, ductility, strength of oil films and other lubricant specifications which must be taken into account with this process.

The data supplied by the Profilometer in exhaustive studies in the automotive laboratory were used to set up qualitative definitions and descriptions of the surfaces produced by turning, grinding, honing and lapping. In addition, the Profilometer assisted materially in the defining of what is meant by Superfinish. In order to introduce and describe the different types of finish, new nomenclature was developed. Terms which are in use as a result of this work include:

1. Micro-inch
2. Scratch pitch
3. Scratch depth
4. Abrasive speed
5. Abrasive pressure
6. Coolant viscosity
7. Surface ductility.

These terms are used in Fig. 1 (Part I, Sept. 1, page 20). In the following paragraphs they are defined with a view to making clear the distinction between Superfinish and the four more commonly known machine operations.

MICRO-INCH:—Micro-inch is a term generally used in the field of sur-

face finishing to indicate smoothness, or roughness in millionths of an inch.

SCRATCH PITCH: — Scratch pitch is the descriptive term used to describe the width of scratches from the high point on one scratch to the next scratch. This pitch is progressively less from turned to the lapped finish, but *Superfinish does not possess scratch pitch.* This is the first fundamental difference between Superfinish and all other developed surfaces.

SCRATCH DEPTH: — Scratch depths produced by different finishing methods have certain peculiarities. The scratches produced by a turned finish vary to a far greater degree than those produced by other methods, but they usually have a uniformity of depth regardless of whether they are formed by a single point tool or a forming tool. The production use of turned surfaces (as surfaces) is so little that space will not be devoted to further discussion of this machining method.

The scratch depth produced by grinding or honing is approximately the same. If the scratches are removed to the base metal by Superfinishing, the part will usually be reduced from 0.000015 to 0.00002 in. in diameter; a flat surface will be reduced approximately half this amount.

On lapped finishes, the depth of scratches is much less, but the results are dependent upon the ability and experience of the man doing the lapping and the time devoted to the work.

Superfinish develops a surface without scratches or with scratches of such minute depth that they are measurable only in micro-inches or by microphotography. Experience with Superfinish shows little difference in the depth of scratches produced by abrasive wheel made of 300 grit material as compared with 500 grit material, but the scratch pitch is much greater; that is, the scratches are wider but not deeper.

ABRASIVE SPEED: — Abrasive speed refers to the relative velocities between the abrasive and the metal surface of the work. In ground finish it is between 3000 and 8000 ft. per min., normally about 5000. In honing, which is both a rotative and reciprocating type of movement, the abrasive has resultant speed of 400 to 1000 ft. per min. The abrasive speed used in producing lapped finishes varies from 20 to 100 ft. per min. It usually is only a translatory motion since the cross travel of the lapping stone is hardly measurable. Superfinish is produced with an abrasive speed of 3 to 8 ft. per min.

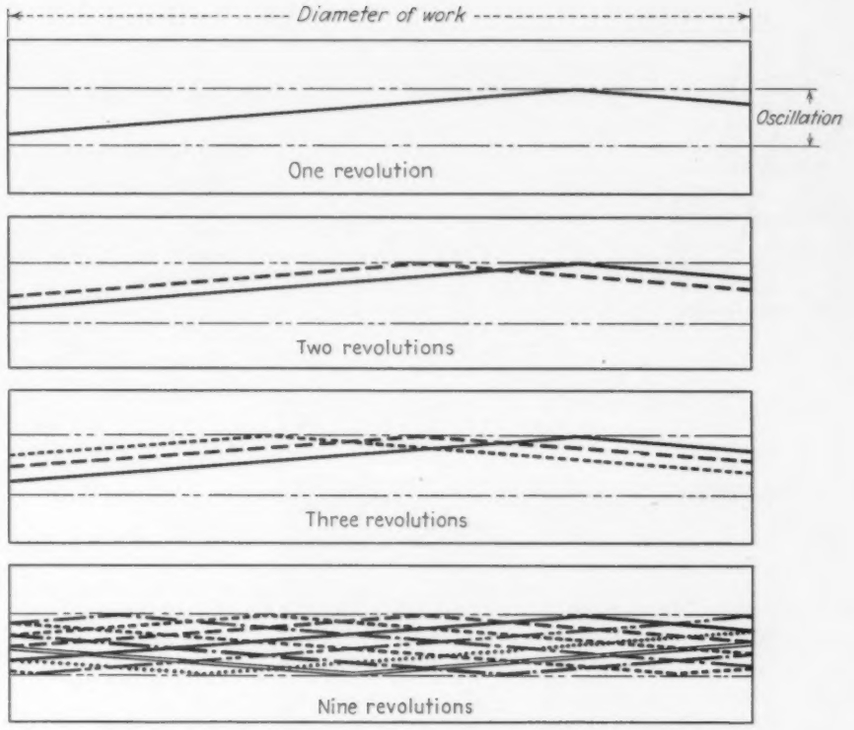


FIG. 7—The proper ratio of work speed to stone oscillation in Superfinishing is such that a single grit or point must never repeat its path along the surface.

It is characteristic of Superfinish that it is produced with extremely low abrasive pressure and low abrasive speed.

ABRASIVE PRESSURE:—Abrasive pressure used in producing ground and honed finishes varies from 50 to 200 lb. per sq. in. whereas in Superfinish the pressure is usually in ounces or at most, only a few pounds. The importance of correct pressure will be discussed later.

FIG. 8 TABLE SHOWING PREFERRED RATIO OF WORK MOVEMENT TO SUPERFINISHING STONE MOVEMENT FOR VARIOUS PARTS

Part	Work rpm	Recip-rocations per min.	Ratio Work rpm Recip-rocations per min.
Pistons	460	240	0.52
Cams	40	235	5.87
Crankshaft bearings	135	450	3.33
Brake drums	150	550	3.66
Flywheel	175	900	5.14
Tappets	950	750	0.78

COOLANT VISCOSITY:—Heretofore coolant viscosity has not been a primary specification, because the object in using coolant was merely to carry away material, to prevent heating of the tool and work, or to prevent loading of the abrasive stones. The coolant used in the production of turned, ground and honed finishes is usually a material comparative to kerosene in which the viscosity is not considered as being an essential characteristic. The peculiarities of Superfinish require strict attention to this factor. *In Superfinish, the fluid is regarded as a lubricant rather than a coolant.*

SURFACE DUCTILITY:—It has been demonstrated that much of the cutting action in the production of some fine finishes is attributable in large degree to a change in the ductility at the extreme surface of the metal, because of heat generated by the cutting stone or tool. As shown in Fig. 1, the cutting tool in a turning operation generates a temperature of 600 to 1000 deg. Fahr., making the metal ductile to a depth of 0.010 in. to ⅛ in. Similarly in grinding, temperatures are 600 to 800 deg. with the metal ductile to a depth of 0.0005 to 0.003 in.; in honing, temperatures are 100 to 300 deg., depth affected is

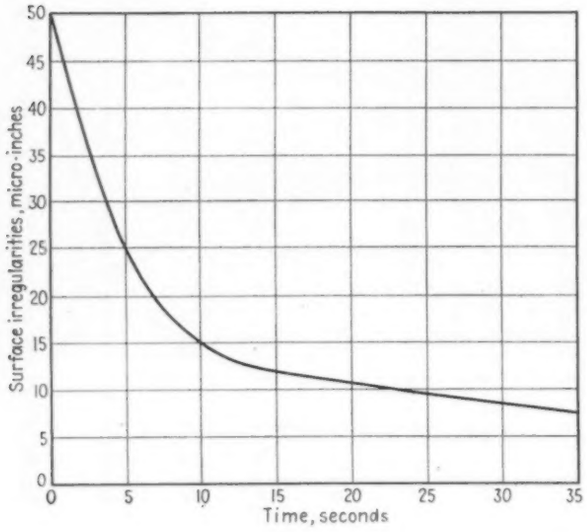


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FIG. 9—This curve showing the rate of stock removal in micro-inches by the Superfinishing process indicates that the bulk of the high spots are removed in the first 10 sec. and that there is little economy in continuing operation beyond 30 sec.

the fact that the low abrasive speed and pressures, coupled with the effects of the coolant or lubricant, produce a surface without developing surface heat and hence without change in ductility. It is claimed that the absence of scratch pitch and the perfection of finish are directly attributable to this and to the great variety and number (3 to 12) motions used in Superfinish.

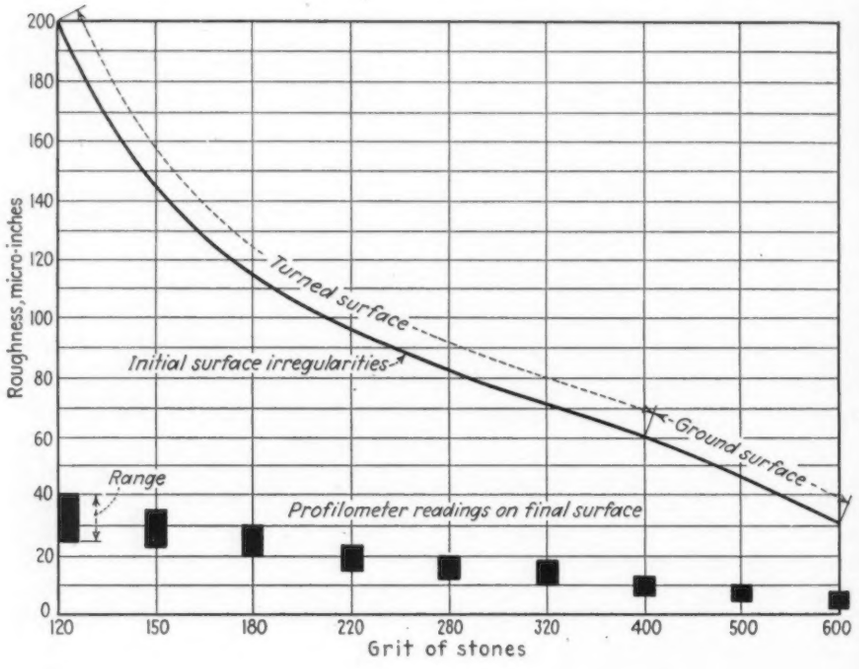
The "hunting tooth" principle is applied as indicated in Fig. 7. Fundamental importance attaches to the idea that a single grit or point must never repeat its original path along the surface. The required balance between work speed and stone oscillation has been worked out experimentally with results shown in Fig. 8.

Repeated experiments indicate the accuracy of Fig. 9 which is a chart showing the rate of stock removal in micro-inches at various time intervals from the beginning of the process until the time when stock removal becomes negligible. Only 10 sec. is required in this case.

0.0001 to 0.001 in.; and in lapping, temperatures range from 10 to 100 deg. deg. and the depth from 0.00001 to 0.0001 in.

Superfinish differs in that surface temperature is raised only by a negligible amount (less than 1 deg.) and the effects are felt only as deep as 0.00001 in.

One of the principal claims for distinction between Superfinish and all other commercial surface finishes is

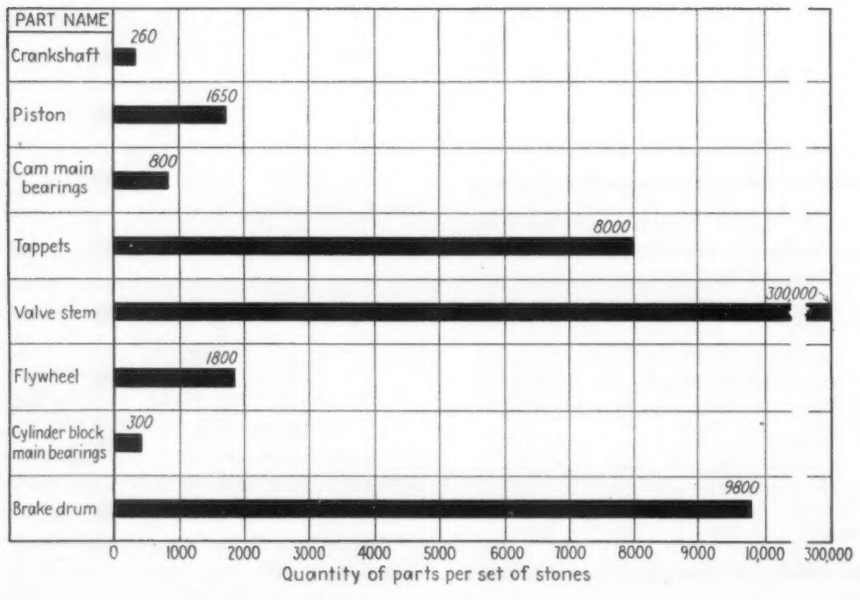


ABOVE

FIG. 10—Final finish as measured by Profilometer readings after Superfinishing for 30 sec. with various grit stones on soft steel, turned or ground to the initial roughness indicated by the upper curve.

BELOW

FIG. 11—Data plotted from actual shop records, showing the average number of pieces Superfinished per set of stones before discarding.



PART NAME	PREVIOUS OPERATION	MICRO-INCHES BEFORE	MICRO-INCHES AFTER
Brake drum	Boring with 0.022 feed	110	11
Crankshaft	Rough ground	50	6
Piston	Rough ground	35	6
Flywheel	Rough ground	33	10
Cylinder block	Reamed	26	4
Camshaft	Finished ground	16	4
Valve stem	Finished ground	14	5
Tappet head	Finished ground	6	2

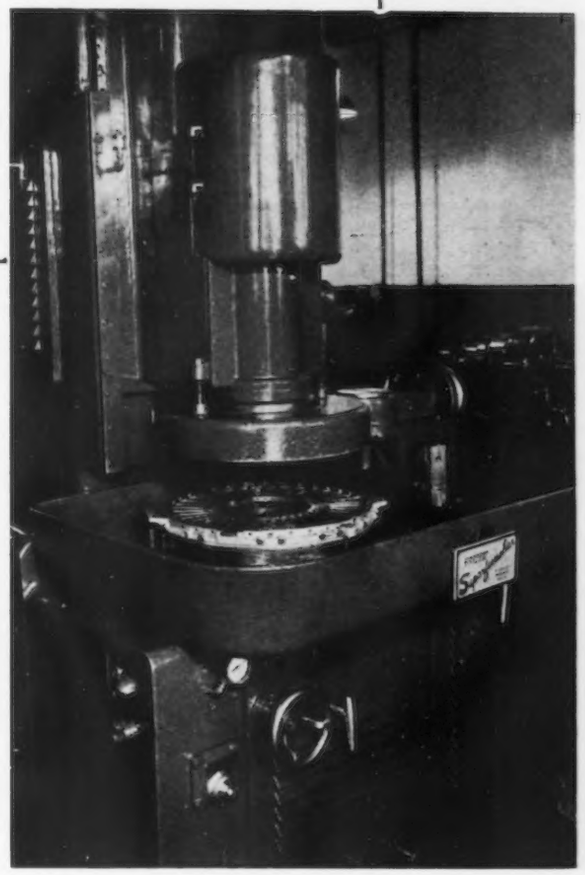


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FIG. 13—"Before" and "After" Profilometer readings of various parts from the rough to the final Superfinish.

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AT RIGHT

FIG. 12—Valve stems are Superfinished in this machine, using a disk type stone in the vertical head. The valve stems are revolved on their own centers, in the opposite direction from the finishing wheel, by means of a cork driving disk, co-axial with the wheel spindle.

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quired to remove the major peaks or crests from the scratches on the usual turned or ground finish. At that time, the effectiveness of the process begins to decrease, and it is necessary to make use of somewhat greater unit pressures of the cutting stones on the surface.

Predictable results depend on "sticking to formula" in this, as in other techniques. Superfinish requires a balance between work speed, oscillation speed, coolant specification, working time, direction of stone movement, initial roughness and the stone coarseness or hardness.

Stone grit has an important bearing on the finish that is achieved. In Fig. 10 is illustrated the effects of 30 sec. application of Superfinish with a variety of stones ranging from 120 to 400 grit. Also shown are the effects of using 400 to 600 grit stones on a ground surface. The 30-sec. limit has been chosen arbitrarily as representative of the maximum time used for Superfinish for production economy.

Records on Stone Wear

From the cost standpoint, the record on stone wear at Chrysler is exceedingly favorable, apparently because the stone, in light contact with part after part, is thereby kept in usable shape. The fluid used is effective to the point of insuring against excessive stone wear while aiding the cutting process. Records have been kept on stone wear and replacement when Superfinishing a number of important automotive parts, and the results are charted in Fig. 11.

On the valve stem Superfinish job, more than 300,000 pieces have been finished without replacing stones. These particular parts are finished with two large stone disks as illustrated in the photograph Fig. 12. All of the other parts are finished with small rectangular stones as shown in diagrams and photographs of the actual operations. The lowest output per set of stones is on the crankshaft, which has an average of 260. Following in order are cylinder block main bearings, 300; cam main bearings, 800; piston, 1650; flywheel, 1800; tappets, 8000; and brake drums, 9800.

Each of these parts comes to the Superfinisher with a different initial surface. The brake drums, as shown in Fig. 13, are bored with a 0.022 in. feed, giving an initial surface measurement of 110 micro-in. This represents an important departure from previous practice when brake drums were turned with a 0.005 in. feed.

This gave an initial surface about 62 micro-in. in roughness.

Rougher Initial Surface Desirable

The production department changed this boring operation to provide a faster feed, when it was learned that Superfinish was best applied to a relatively rough surface to get the quickest operation for final surfacing. In addition, the faster feeding with the boring tool gives a more accurate cut with less loading of the tool and resultant chatter or out-of-round. The final finish on the brake drum is held to 11 micro-in., providing greater frictional contact between the drum and lining, better braking, "softer" pedal pressure and less brake wear. This is typical of the miscellaneous improvement of the product effected in conjunction with the use of Superfinish. Also it indicates economy of operation. On all other parts, similar improvements are indicated in the chart.

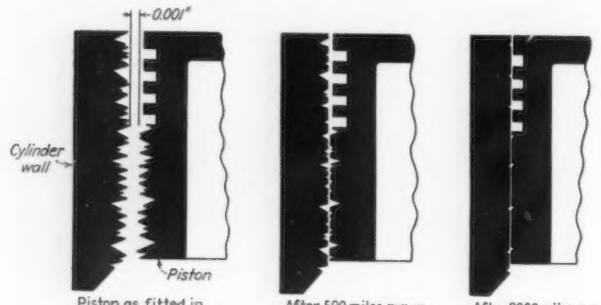
In diagrammatic form, the effects of piston wear are illustrated in Fig. 14, where the former rough surface piston and wall were permitted to wear in during the break-in period on the automobile engine. Now, the piston previously rough-ground to 35 micro-in., is Superfinished to 6 micro-in. average roughness, and the cylinder bores are given a similar finish. The effects are said to be virtual elimination of the piston and wall wear during the break-in period. Formerly this wear amounted to 0.002 to 0.003 in. net on the diameters.

Moreover, there is graphic proof that the quality of finish can be maintained in production. Over a period of 12 weeks, the variation has been shown to be negligible, whether the allowable average roughness was set at ten millionths of an inch or only two millionths as in the case of piston pins (Fig. 15).

It has been the practice during the development of Superfinish to make sample tests everyday on all the various parts to which the process was applied. The portable Profilometer is in use for this work and a record of all readings is maintained. The production record shown herewith is compiled from the cumulative readings by week.

With any wearing surface in automobiles as objects for the possible application of Superfinish, the physical task of applying the process has been a gigantic one. Each part has presented peculiar problems, but solutions have been reached by adherence to the fundamentals learned in study of the crankshaft and bearing races machining process.

The mechanical division of the Chrysler Corp. worked in close conjunction with the Foster Machine Co., Elkhart, Ind., in the design of equipment. The tappet, for instance, presented the problem of Superfinishing a head curve on a 30 in. radius. At-



Piston as fitted in rough cylinder bore

After 500 miles run-in. Note how crest of scratches are worn off

After 2000 miles run-in Note how scratches have worn down to basic metal, similar to a lapped surface

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FIG. 14—Superfinishing on piston and cylinder wall results in a surface comparable to that obtained by 2000 miles of run-in, starting with conventionally finished bores and rough ground pistons.

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PART NAME	Micro-inch readings by weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
C-18 Crankshaft main bearings	6.6	5.74	6.40	5.42	6.22	7.56	6.36	5.75	6.33	5.63	6.20	5.99
Pin bearings	6.1	6.39	6.16	6.50	6.23	6.21	6.22	6.83	6.26	5.56	6.13	5.81
S-5 Crankshaft main bearings	7.7	4.8	6.86	6.11	6.74	6.90	6.75	5.12	6.66	5.52	6.44	5.25
Pin bearings	7.66	7.48	7.64	6.32	7.39	5.83	7.20	7.04	7.18	5.37	6.84	5.95
Truck-Crankshaft main bearings	7.64	5.06	6.78	5.62	6.57	5.93	6.48	6.62	6.48	5.49	6.28	6.62
Pin bearings	8.14	6.66	7.82	6.57	7.51	8.72	7.68	7.83	7.69	6.49	7.44	6.25
Eight-Crankshaft main bearings	5.88	4.04	4.95	4.47	4.99	4.87	4.97	5.00	4.97	4.66	4.90	4.82
Pin bearings	5.118	4.92	5.20	4.84	4.98	6.90	5.28	5.09	5.26	5.04	5.20	5.07
Cylinder block Six	3.91	3.91	3.90	3.18	3.76	3.63	3.73	4.00	3.84	4.02	3.87	4.29
Eight	3.7	3.72	3.71	3.93	3.76	4.58	3.88			3.59		
Piston	5.97	5.97	5.97	5.87	5.94	6.68	6.09	6.65	6.19	6.19	6.16	5.50
Piston pins	2.65	2.2	2.52	1.89	2.38	2.04	2.32	2.06	2.28	2.25	2.22	2.34
Connecting rods	13.6	14.84	13.97	13.95	13.97	13.60	13.91	13.66	13.85	13.83	13.79	13.33
Valves	6.7	5.77	5.96	5.52	5.76	4.35	5.40	4.26	5.11	4.87	5.06	4.66

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FIG. 15 — Records of Profilometer readings taken on various automotive parts over a period of 12 weeks indicate that the variations in allowable surface roughness are negligible, even for piston pins for which the "roughness" is of the order of 2 millionths of an inch.

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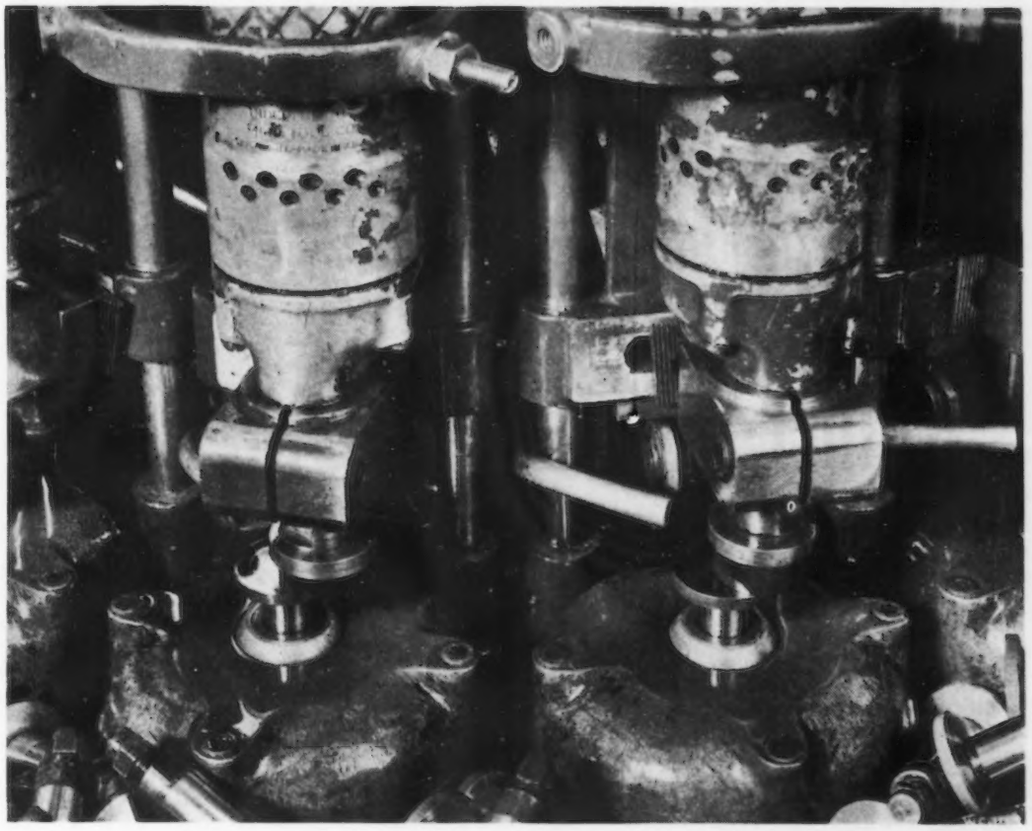

FIG. 16—The valve tappet finishing machine has 14 heads arranged in a circle, but only two of them are shown in this close-up view. Individual Hi-cycle motor units made by the Independent Pneumatic Tool Co. drive the Norton cup-shaped stones, rotating them eccentrically, while the tappets are slowly revolved on their own centers. The entire machine head also rotates, so that the operator can load and unload from one position. Automatic cycle control provides for raising and lowering of the finishing heads and clamping and driving of the tappets.

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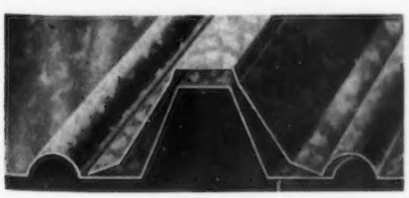
tainment of the necessary stone motion and oscillations adjusted to produce the required finish was solved by the use of cup-shaped stones mounted off center. The parts are carried in a table-like fixture, heads up, which rotates, carrying the part from loading station to unloading. Meanwhile, the cup-shaped stones descend from above, contacting the parts. The work revolves 950 r.p.m. while the stone mounted 3/32 in. off center turns 750 r.p.m. in the offset direction, maintaining a 3/16-in. oscillation. The equipment and setup are shown in Fig. 16.

Armco Brings Out New Galvanized Roofing

A NEW kind of galvanized roofing with a patented spring-pressure lap and other features has been announced by the American Rolling Mill Co., Middletown, Ohio. It is known as Armco galvanized "Seal-Krimp" roofing, and is said to be storm-proof, weather-tight, and easily installed. It costs no more than ordinary metal roofing per square applied.



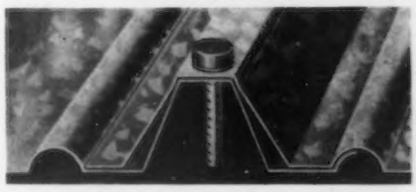
View before nailing of the patented spring-pressure lap that features Armco Galvanized "Seal-Krimp" roofing.

The new roofing is available in three grades of metal—copper-bearing steel, open-hearth steel and ARMCO ingot iron.

When Armco "Seal-Krimp" is placed in position and nailed down, the sections are held firmly together with spring tension at three points. Drainage channels and siphon breakers are built-in features.

The pressure lap at the lower end of each sheet gives added protection, providing a pressure-sealed contact at the end laps and an effective water stop. The sections nest snugly together. Because of the spring pressure seam, "Seal-Krimp" must be laid one row or width at a time, starting at the eaves and working towards the ridge.

Roofing accessories available with "Seal-Krimp" include adjustable ridge roll, made in two pieces to fit any ordinary roof pitch without bending or malleting. It may be adjusted lengthwise to fit V's on either side of the ridge. Other accessories available are end wall flashing and gambrel joints.



THE spring-pressure lap after nailing. The upright legs are forced downward and outward. Pressure of the flanges is against the lower lapped section. They abut the bead on one side, while on the opposite side the bead is forced down and into the upturned flange. This holds the sections together firmly.

J. & L. Opens Unique Pilot Mill-Laboratory Unit

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By T. C. CAMPBELL
Pittsburgh Editor, The Iron Age

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FIG. 1—The outstanding feature of the pilot plant is this open hearth furnace with a capacity of 1500 lb. It is of the recuperative rather than the regenerative type with an unusual type of burner. Some features of this furnace may be applicable to those used in commercial production.

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BRIDGING the gap between research and everyday production by merging theory with commercial practice best describes the methods and procedures used in the new Jones & Laughlin Steel Corp. pilot-mill development units and laboratory which were formally opened this week at Pittsburgh.

Main features of this new approach to research is a series of small scale steel mill units in addition to the usual laboratory facilities found in research departments. Thorough investigation of steel making processes ranks in importance with the research and development of steel products.

Technique followed by the staff in studies and experiments, is such that control is maintained from the making of steel through the forming and finally to the actual testing. Commercial practice is simulated in the laboratory by the use of a small open hearth furnace, an electric arc furnace, an induction furnace, a steam hammer, and two small rolling mills, one of which is capable of duplicating blooming mill practice. In addition to these experimental but practical processes, is a series of physical tests involving the use of recently developed, as well as standard, testing equipment.

In normal research practice, a great many ideas are originated and given considerable thought and effort. However, the philosophy behind this new approach to product and process development advocates the concentra-

tion of activity on those ideas which give promise of becoming commercially applicable. Projects are soundly investigated and developed from both a theoretical and practical standpoint before being certified to the regular mill production department that they are commercially feasible.

Projects are assigned to each division of the laboratory on the basis of the general fields of science or activity, such as metallurgy, physical metallurgy, development or pilot plant, machine shop and testing, library and patent division, and the service or clerical division.

The entire research and development division is under the direction of H. W. Graham, general metallurgist of the company, who facilitates the coordination of the division's work with the metallurgical departments in the mill. This coordination insures that the attention of the research staff, which is under the supervision of H. K. Work, is directed toward problems of practical value.

Much of the equipment in the pilot mill units and laboratory, besides being utilized in carrying out research investigations, is, itself, under constant scrutiny for further development. This feature is especially applicable to the small experimental open hearth and special testing equipment.

The laboratory building proper has been designed more for utility than for appearance, and the construction has provided for additions when necessary. Offices, libraries, machine shop and testing laboratories surround the steel mill unit.

A 1500-lb. experimental open hearth with an unusual type of burner is recuperative, not regenerative. Regular open hearth practice is used in practically every step of steel manufacture in this small one-way fired open hearth unit. The furnace was designed and built by Jones & Laughlin engineers with the thought in mind that some features of the construction and operation would be applicable to commercial production of steel.

Special controls on this furnace are provided for air temperature, gas volume, air volume, furnace pressure, roof temperature, and stack draft. A successful application of this recuperative type open hearth furnace to commercial practice could go a long way toward reducing melting time and hence, steel making costs.

Special tests on slags and steel production are also conducted with the use of a 375-lb. capacity electric arc furnace and a 30-lb. capacity electric induction furnace is provided for other

RESEARCH AND DEVELOPMENT LABORATORY INVENTORY OF EQUIPMENT

CENTRAL SHOP

Machine	Capacity	Remarks
Lectromelt furnace	375 lb.	
Ajax-Northrup induction furnace	30 lb.	
Open hearth furnace	1500 lb.	Recuperative, and of original design.
Rolling mill (large)	4 in. to 1 in. square	3-high 10 in. mill.
Rolling mill (small)	1¼ in. to ½ in. square	2-high 6 in. mill.
Surface combustion furnace	3 ft. x 6 ft. hearth, 2400 deg. maximum temperature	Billet heating.
Steam hammer	500 lb.	
Cupola	18 in. diameter	
Soaking pit	1500 lb.	
Hayes electric heat treating furnace	4 in. x 4 in. x 12 in. hearth	
Hobart welding machine	600 amp.	

Chemical bench and equipment, for both metal and slag analysis determinations, is located in the central shop. A Burrell high temperature furnace for making carbon analysis of steel by combustion is one of the interesting pieces of equipment used in the work.

MACHINE SHOP

South Bend lathe	11 in. swing.	
South Bend lathe	16 in. swing.	
Cincinnati milling machine	2-L universal.	
Delta woodsaw and jointer	8 in. saw, 6 in. jointer.	
Standard pedestal grinder	10 in. wheels (2)	
Laidlaw metal bandsaw	9 x 9 in. billet capacity.	
Marvel highspeed hacksaw	9 x 12 in. billet capacity.	
Portable grinder	6 in. wheels (2).	

PHYSICAL TESTING LABORATORY

Foeppl-Pertz damping capacity tester	Test ⅝ in. square x 12 in. long	Measures damping or internal friction of metal by method of free vibrations.
Bakelite mounting press	1 in. diameter mounting	Clear and opaque mountings for metallurgical specimens.
Belt grinder	4 in. belt	For polishing metallographic specimens.
Carpenter torsion impact machine	¼ in. diameter specimen	
Brinell hardness tester	3000-Kg. load	
Tinius Olsen stiffness tester	30 in.-lb.	Tour-Marshall design.
Rockwell hardness tester		
Hoskins electric furnace	Type FD204, 15 to 45 amp.	Small muffle furnace.
Hoskins electric furnace	Type FD104, 5.46 amp.	Small pot furnace.
Rockwell dilatometer	Model LA—Specimen not over 1½ in. square x 3 in. long	
Krouse high speed fatique machines (three)	Up to 0.125 in. diameter	For wire specimens.
Repeated torsion fatigue machine	Up to ½ in. diameter specimen.	
Fatigue machine with corrosion attachment	Up to 0.400 in. diameter specimen.	
Fatigue machine		
Losenhausen tensile machine (universal)	8000 to 40,000-lb. capacity, adjustable range	
Tinius Olsen torsion	10,000 in. lb.	
Izod and Charpy	240 ft.-lb. max.	Combined Izod & Charpy machine.

METALLOGRAPHIC LABORATORY

Zeiss metallographic microscope	2250 diameters (camera 8 x 10 in.) to 4000 diameters	With polarized light and dark field attachments.
Bausch and Lomb microscope	2250 diameters	
Microcharacter		
Dry mounting press	11 x 14 in.	
Leica camera	With assorted lenses	35 mm. negative.
Eastman motion picture camera	With assorted lenses	
Eastman portrait camera	8 x 10 in.	
Bell & Howell motion picture projector		
Spencer delineascope		
Dark room equipment	Washers, driers, etc.	For all types of film and plate.
Fisher metallographic polishers	8 in. wheel, variable speed.	
Eastman professional printer	11 x 14 in.	
Enlargers (2)	4X—(5 x 7 in. negative)	Eastman.
	(32 mm. negative)	Leica.

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FIG. 2 — Teeming miniature ingots in the pilot plant. These weigh from 185 lb. to 900 lb. and are broken down on one of the two rolling mills.

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BELOW

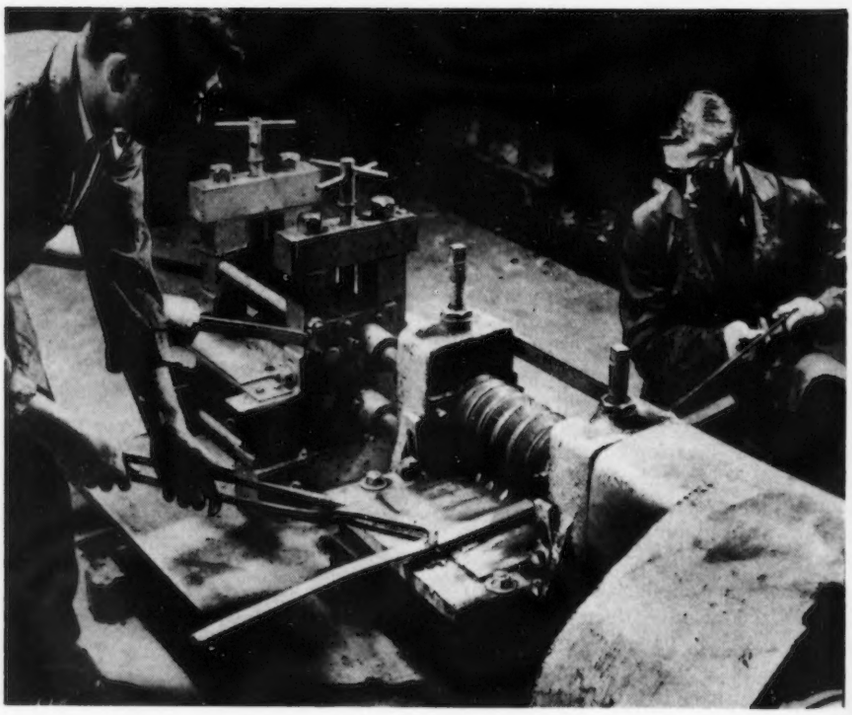
FIG. 3—This miniature rolling mill is used to reduce bars into convenient sizes for test specimens. A gas fired heating furnace, a small soaking pit and a 500 lb. steam hammer are used in this work.

accurately controlled experiments in steel making.

An 18-in. cupola to be used later in conjunction with a small bessemer converter which is to be constructed, is part of the laboratory equipment. A gas-fired muffle provides an individual soaking pit for the smaller ingots.

Ingots in the pilot mill range from 185 lb. to 900 lb., the latter size being of a slabbing type. In many cases the actual ingots made in the experimental mill can be taken to regular rolling mills for processing while in other instances the production is made on the rolling mills located in the laboratory. A 500-lb. steam hammer is used at times for reducing the experimental ingots previous to rolling.

Products of the pilot plant units are sent to a well equipped machine shop where they are prepared for testing. Considerable research on the development of proper test pieces is carried on regularly in the machine shop.



The physical laboratory, in addition to the usual tensile, impact and fatigue tests, includes a variety of comparatively recently developed machinery. A stiffness tester for sheets and strip, a damping capacity tester, a dilatometer, and other special machinery, complete the physical laboratory. Equipment is frequently changed or redesigned to facilitate special investigations.

A complete metallographic laboratory with Zeiss microscope and camera, dark room, photographic room and motion picture camera is available.

Another useful unit of the development laboratory is a research library comprised of over 600 books and 50 technical publications as well as various association proceedings covering pure sciences to the production of finished products. This service is available not only to the research staff but to all those who are interested.

The staff of the research and development division is in constant cooperation with the regular mill metallurgical department and a considerable portion of the work involving projects under study, is carried out in the mill proper. The pilot-plant units were established primarily for improving physical properties of carbon steel. Considerable research on machinability continues and a high speed motion picture camera has been utilized in photographing tool action during machining. Non-aging steels are under study at the present time and further progress has been made in an investigation on the sensitivity or degree of change in the physical properties of steel resulting from cold working.

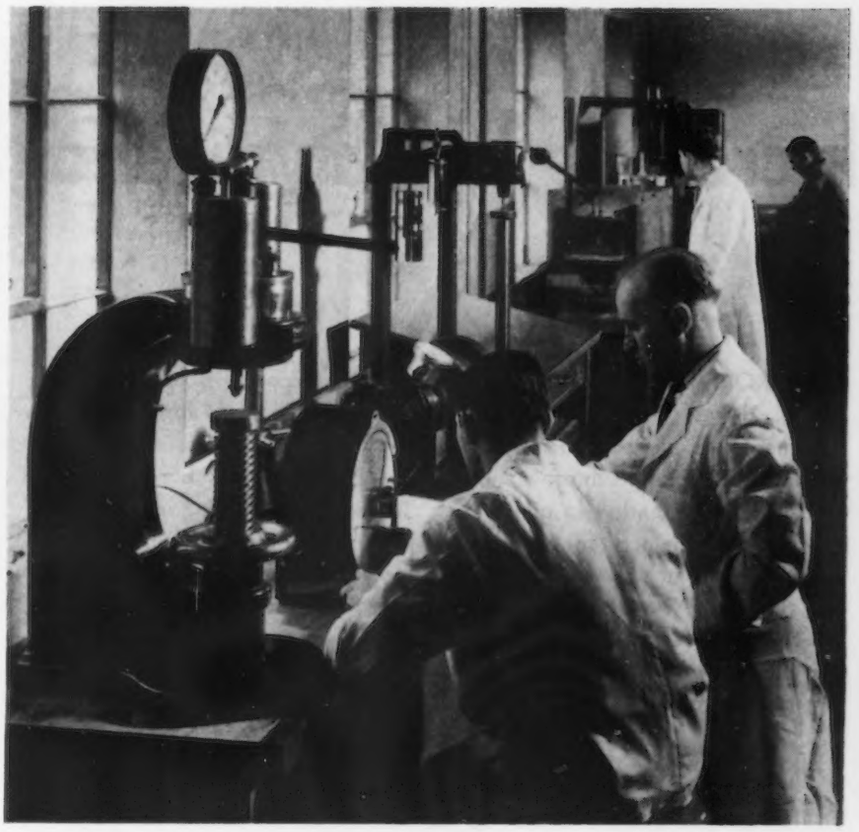


FIG. 4—One section of the physical laboratory. Special equipment, in addition to the usual Brinell and Rockwell hardness testers, dial dialatometers and fatigue testing machines, are included in this department.

Wean to Install New Acid Disposal System

WEAN ENGINEERING CO., INC., Warren, Ohio, manufacturer of strip steel pickling equipment, has been licensed by the Allied Development Corp. to make and install waste acid disposal systems by a new process discovered by Allied Development. Sharon Steel Corp. has a plant under construction in Sharon, Pa., which, when completed, will treat 10,000 gal. of waste pickle liquor each day.

The problem of disposing of waste pickle liquor, a perplexing one in the past, is now said to be intensified, due largely to the fact that in the large strip mills the acid concentration is considerably higher in the pickle tanks at the time it is necessary to change the bath in order to secure good operating results; also, due to the fact that most plants are now producing some type of alloy requiring acids other than sulphuric. The process developed by the Allied Development Corp. is believed by the maker to be the only one that can dispose of other types of acids that are generally used for pickling alloy steels.

An outstanding point is that the system will take all the rinse water which normally carries a very low percentage of acid and dispose of same. The disposal of this rinse water, with light acid content, has definitely increased the disposal problem in recent months, for even these small amounts have caused stream pollution and have caused serious objection on the part of Pennsylvania state officials.

The process treats the waste acid in such a manner as to create a precipitate which is passed through filter presses. The affluent is clear, uncontaminated water, which can be discharged into sewers or streams without danger of pollution or can be used in internal plant operations.

With the water removed, the resultant product in its plastic form is known as "Ferron." When this material has been formed and dried, it can be used for numerous purposes. The material is fire-proof, has high insulating qualities and can be cut or sawed with ease.

Increases in Range and Size Feature

FROM automatics to planer drives, recent announcements of the machine tool builders point to improvements in design intended to give better performance, to increase the range of speeds and feeds, the size of work handled and in the adaptability of the equipment. Two new tool and cutter grinders go far in covering practically any conceivable angle or movement required for sharpening modern cutters. Another machine combines bore grinding and face grinding in a single set-up, and a center grinder has been developed as an aid to accurate grinding of work on centers. Some interesting features are found on two small, high production millers.

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By FRANK J. OLIVER
Associate Editor, The Iron Age

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OPEN end gearing is now available for driving attachments in the new line of six-spindle Conomatics made by the *Cone Automatic Machine Co., Inc.*, of Windsor, Vt. Hence the time required to put any attachment into operation is reduced to a minimum. The high and low speed cam action may be cut out when checking tools, and power feed engagement is instantaneous and can be controlled from either side of the machine. A wide range of feeds and a slow speed for tooling are given through a power feed countershaft. A power feed reverse is also provided.

Two forming tools and a cut-off tool are held in the front slide, and three formers are operated in the rear slide Six end working positions are provided by the cylindrical turret, and two independent end positions are supplied by the semi-turret, which also operates the non-rebound stock stop arm. Two more independent end stations are provided by the auxiliary spindle attachments. The indexing mechanism has been refined, and the design throughout the machine has been planned to reduce noise and wear.

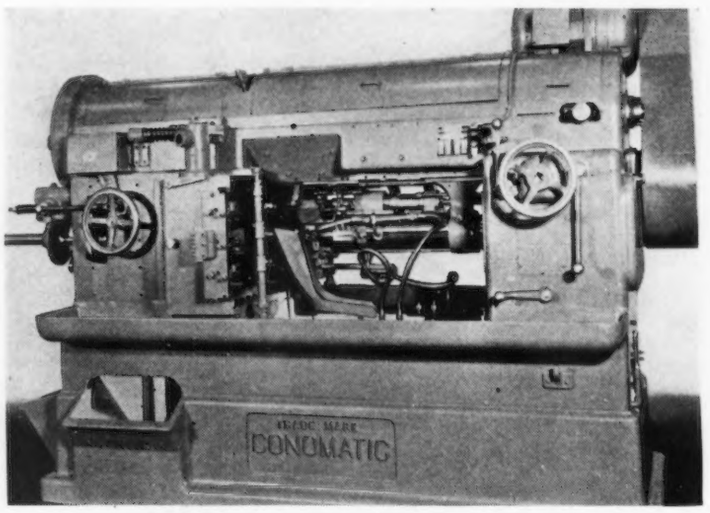
Boring and Drilling Machine

TWO 2½-in. diameter hydraulic cylinders, one in each column, are used to actuate the feed movement of the multiple spindle head on the No. 900 vertical boring and drilling machine, recently brought out by the *W. F. & John Barnes Co.*, Rockford, Ill. The driver head or flange is counterbalanced and is guided by bushings engaging two hardened and ground round bars. Cylinders and bar guides are fully protected by chip guards. Table is 26 in. from floor and fixture space is 26 x 24 in., making the unit adaptable for use with indexing or stationary type fixtures or for conveyor through type work.

The Barnes hydraulic feed unit provides the usual automatic cycle through the medium of a constant delivery rapid traverse pump, variable delivery piston type feed pump and a control valve used in conjunction with standard trip dogs. Capacity of the machine is any operation or group within the capacity of the 7½-hp. driving motor. Maximum feeding pressure is 8200 lb.

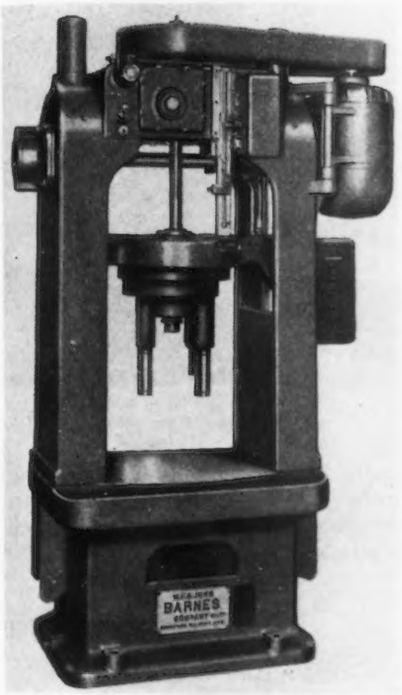
Grinding Machines and Accessories

INTERNAL and face grinding operations are combined in the same set-up in the No. 72A3 grinding machine recently developed by the *Heald Machine Co.*, Worcester, Mass. While a great deal of the mechanism is



MANY improvements in performance and operation have been incorporated in the new line of six-spindle Conomatics, the outstanding change being in the design of attachment driving parts.

Recent Machine Tool Designs



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BARNES No. 900 vertical hydraulic boring and drilling machine was designed especially for multiple spindle work in connection with stationary or indexing type fixtures or a through conveyor.

similar to the company's regular Gage-Matic, the base construction is different and a second, facing wheelhead has been added, as well as cross feed to the workhead. The two wheelheads are mounted on the longitudinal slide, the one at the rear being a standard Gage-Matic head with the fully automatic cycle, and the one at the front carrying a cup wheel for face grinding. Both wheels are driven by a single motor, but at different speeds.

The base is T-shaped, with a hydraulic cross-slide for the special workhead mounted on the head of the T. For grinding the hole, the cross-slide is indexed to the rear; for face grinding, to the front. Positioning is controlled by stops and slow-down valves cushion the shock. For the face grinding operation, a handwheel cam type facing attachment mounted on the front of the machine is used, incorporating a dial indicator for governing stock removal. A special hand operated diamond and intermediate truing dog are provided for truing the cup wheel. The internal grinding wheel is automatically trued in the usual way, using solid plug gages as standards.

FOR checking the basic straight line table motion of its center type grinders by the wire test method, *Cincinnati Milling Machine & Cincin-*

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FOR loading the differential housing shown, a fixture with a sub-slide parallel with the main slide increases the total stroke of this Ex-Cell-O precision boring machine. To bore the two pinion bearing seats in line and yet jump a shoulder between them, the fixture also has a cross-slide which allows the part to be indexed over just before the main table feed is cut in so that the front boring tool will clear the shoulder. The tool holders are eccentric to the boring bar, the extension of which is piloted in the fixture. T-C tools are used.

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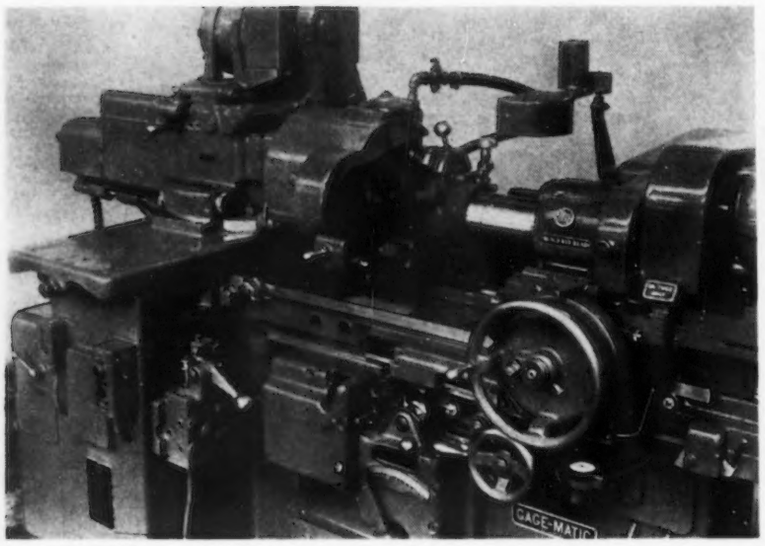
BELOW

TYPE H, 2-30 horizontal hydraulic broaching machines made by American Broach & Machine Co., Ann Arbor, Mich., and intended for light internal broaching operations, have recently been improved. Return stroke speed has been increased to 48 ft. per min., the cutting stroke remaining at 28 ft. A Sundstrand pump of 22 g.p.m. capacity at 0 pressure has been added, as well as hardened and ground steel guides built into the draw head. Dual cylinders are used. Normal capacity is 2 ton; maximum, 4 ton. Stroke, 30 in.



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ON the new Heald No. 72A3 T-base grinding machine, after an internal bore is ground with the Gage-Matic cycle, without rechucking, a separate cup wheel is used to face the adjacent external surface when the work head cross-slide is indexed.

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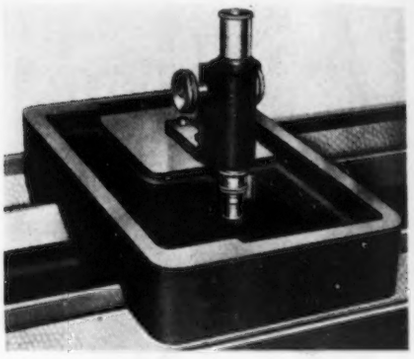
THE Cincinnati microscope alining instrument is for checking long center-type grinder beds by the so-called wire test method.



nati Grinders, Inc., has designed a miscroscope alining instrument. It consists of a cast iron platen having a V and a flat bearing, duplicating the table bearing surface. Mounted on the platen is a miscroscope with a scale graduated in half thousands across the optical field. A wire is stretched tight from one end of the bed to the other and forms a straight line for taking readings at intervals of about 2 ft. as the instrument is slid along the ways. A new length of wire is recommended for each test, and 750 ft. of music wire is included in the outfit. Tension brackets are usually supplied by the user.

Combination Cutter Sharpener

POSITIVE mechanical control of sharpening operations is afforded in the new B-C combination sharpening machine for reamers, hobs and milling cutters. A product of the *Barber-Colman Co.*, Rockford, Ill., this machine supplements the B-C automatic hob sharpening machines and the reamer sharpening machine, and although the specialized automatic features have been eliminated, all of the precision features have been retained. The combination machine is particularly advantageous on small volume work. Following of spiral leads, indexing, diameter size, blade profile, feed to wheel on tooth face grinding, diameter cutting clearance, relief clearance, wheel dressing, radial

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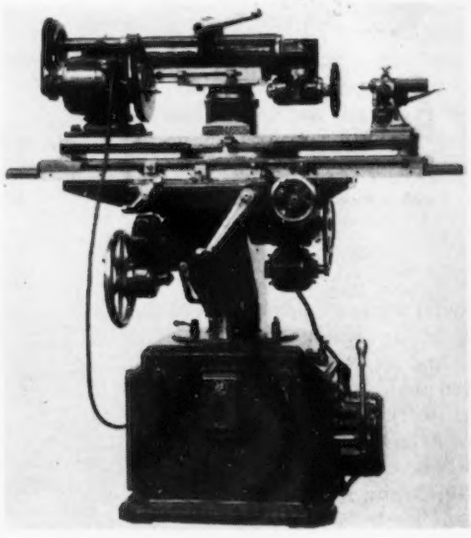
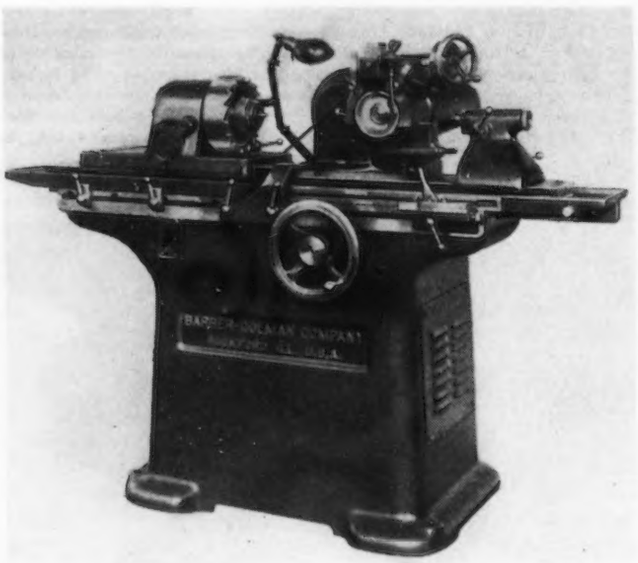
LEBLOND'S new No. 3 cutter grinder has wheel head circle movement in three planes plus longitudinal movement, and the work table swivels, slides and can be elevated and moved crossways.





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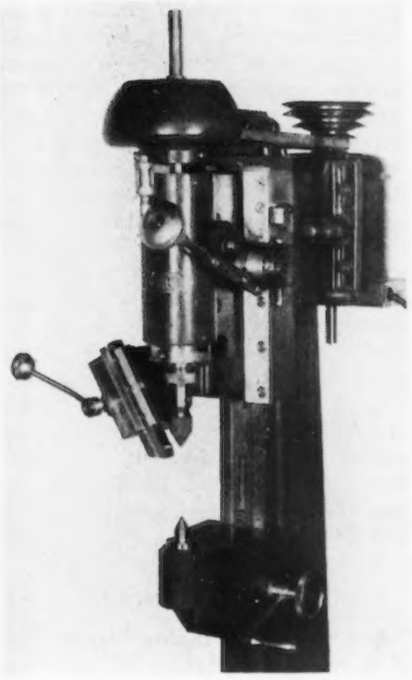
THE Barber-Colman combination reamer, hob and cutter sharpening machine resembles a surface grinder in that the platen carrying the index head and tailstock is traversed by a rack bar through the large handwheel at the front. Platen is pivoted at the left end and has cross motion at the right end controlled by form cams. The index head contains a tangent bar and fixed follower for rotating the work to coincide with the lead of its blades or gashes. Wheel head may be raised or lowered and may be swiveled to the proper angle for lead.



ABOVE

THIS Ex-Cell-O center lapping machine consists essentially of a cast iron base and column, a motor driven precision ball bearing spindle, an adjustable work rest and a dressing device.

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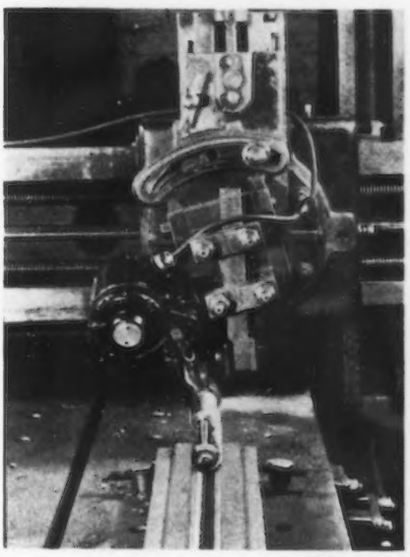
A DUMORE No. 5 grinder with V3 extension quill is shown mounted in a George Gorton planer, grinding a mold to form rubber church pew tops. The job was done in one-third the time over a former hand scraping method.

faces on high helices are all under precision control, and each mechanical movement can be duplicated on any number of pieces.

The machine will sharpen any make of reamer, and is equally adaptable for sharpening hobs, affording accuracy of index, tangent bar control of gash helix and positive feed control. It is also capable of sharpening milling cutters where better than average accuracy is required. Capacity with a cup wheel is 8 in. diameter; with a dish wheel, 6 in. Maximum length of stroke 24 in., or 8 in. with highest helix (6-in. lead). Maximum length between centers is 33 in.

A COMPLETELY universal cutter grinder, the No. 3, has just been introduced by *R. K. LeBlond Machine Tool Co.*, Cincinnati. The wheelhead has three independent and coordinated planes of full circle movement to take care of the new types of cutting tools having a multitude of angles, sizes and shapes. The upper part of the work table swivels for angular adjustment and the lower part for longitudinal movement by slow or fast hand traverse or by power feed. The saddle supporting the table has cross movement of 8 in. and the knee has a vertical movement of 9 in. on the tubular column, which swings on the stump through 360 deg.

The wheel housing also has longitudinal movement through rack and pinion, and a spline shaft connection is made between the spindle bevel driving gears and the driven pulley. Motor is in the base, and the standard construction has a variable-speed drive coupled to the motor, giving spindle speeds of 3100 to 6500 r.p.m.



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A THREE-DIGIT counter geared up with the micrometer handwheel gives direct diameter readings up to 99.999 in. on Lodge & Shipley lathes. A similar counter is hooked up with the carriage traverse handwheel at the left, giving readings up to 999.99 in.

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in four steps. Four speeds are also available for the workhead through a stepped pulley driven from a separate motor.

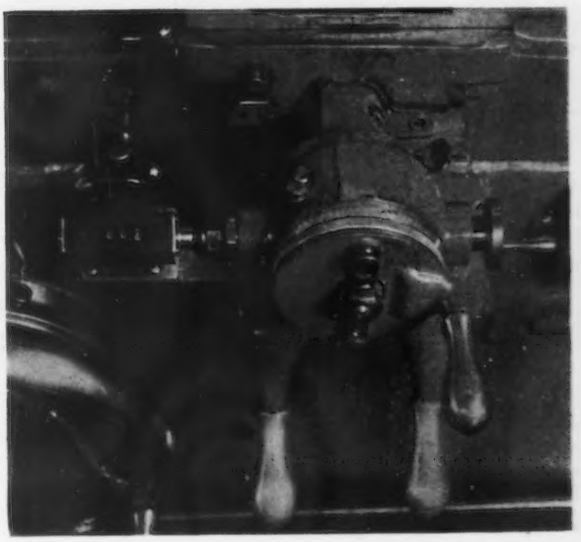
Center Lapping Machine

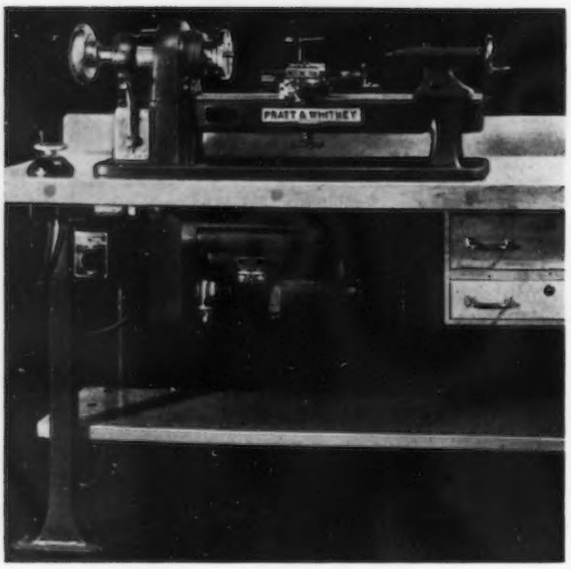
A MODERATELY priced machine for lapping the 60-deg. V centers of work that is later to be ground between centers to close tolerances is announced by *Ex-Cell-O Corp.*, Detroit. A single spindle, precision ball bearing spindle carrying the abrasive stone is mounted on the upper part of a vertical column, and the supporting work center has rack and pinion movement on the lower part. Work up to 8 in. diameter and 36 in. long can be accommodated. The wheel spindle mounting is on balls in hardened V-ways and the spindle is lowered by means of a hand lever. The assembly is counterweighted.

A four-step cone pulley transmits power by V-belt from the motor to a floating spline bushing through which the spindle passes. Normal wheel speed is 5000 r.p.m. A diamond dresser for the lapping stone is mounted in a fixed 60-deg. position, and a hand lever is used to traverse the diamond over the stone when the spindle is in its furthermost down position.

Lathe Developments

ATTACHMENTS are now available for the direct measurement of diameters and lengths on lathe sizes from 12 to 36 in. made by the *Lodge & Shipley Machine Tool Co.*, Cincinnati. For registering the exact diameter of the work piece, a mechanism similar to the regular micrometer ball stop has been combined with a three-digit counter. The counter reads up to 99.9 in. and each division of the micrometer dial represents 0.001 in.





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PRATT & WHITNEY has added a 7 x 16-in. and a 10 x 20-in. size to its line of precision bench lathes. They have Transitorque drive and cam-lock spindle noses.

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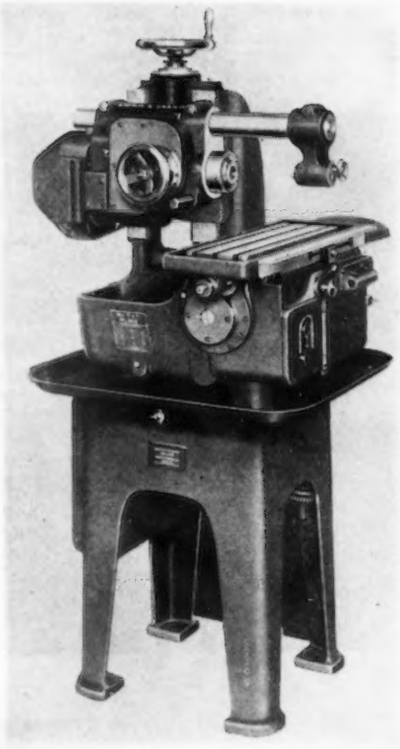
A CAM drive on the table of this new No. 000 Brown & Sharpe plain miller gives high speed advance and return in 1/3 sec., with 16 cutting feeds available through change gears.



on the diameter. Register between the dial and counter is set at the factory, but arrangement is provided for making resettings, if required.

The length reading attachment for carriage travel is similar, except that the counter has four digits reading to 999.9 in. and the micrometer dial on the apron handwheel has graduations representing 0.01 in. of carriage travel. When traveling toward the headstock, the micrometer dial and counter readings increase, and vice versa.

TWO new sizes of bench lathes, 7 x 16-in. and 10 x 20-in., have been announced by *Pratt & Whitney, Division Niles-Bement-Pond Co.*, Hartford. Aside from size and capacity, the two machines are much alike. The spindles are mounted on preloaded precision ball bearings, permanently sealed and lubricated. Selective spindle speeds from 150 to 1500 r.p.m. with a ½-hp. motor, or 225 to 2250 r.p.m. with a ¾-hp. motor are available on either size through the medium of Transitorque drive and multiple V-belts. Speed changes are made by simply turning a graduated knob. Both sizes are equipped with cam-lock spindle noses, which are said to have all the advantages of the standard flange type nose, with the added speed of attachment of this type. The tailstock spindles are graduated for drilling to depth.

A TURRET lathe attachment for turning locomotive frame taper bolts from 1 to 2½ in. maximum diameter is announced by *Gisholt Machine Co.*, Madison, Wis., for use on its 1L or 2L turret lathes. To cover the range, the system employs a set of 12 plug gages which have a taper of ⅛ in. per ft. or twice that of standard locomotive frame bolts, so that the gage contacts and measures only the large diameter of frame holes. In the attachment, the cutter is initially adjusted for diameter by means of one of these plug gages inserted in the center hole. A guide bar with tapered guide cam is fastened to the headstock, and in operation, as the carriage feeds forward, the cam causes the tool slide and roller support slides to move outward at a uniform rate. The rollers follow immediately behind the tool, rolling on the finished taper surface and burnishing it. These rollers are mounted on needle bearings and the slide screws and bevels are carried on ball bearings.

Small Milling Machines

AN automatic milling cycle with exceptionally rapid advance and return of the table is one of the features of the No. 000 plain milling machine recently announced by *Brown & Sharpe Mfg. Co.*, Providence. Rapid table movement is provided by a single driving cam, giving forward movement at 365 in. per min. and return at 737 in. per min. A table dog engages cutting feed within an accuracy of 1/16 in., and 16 rates of feed are available, from 9/16 to 24 in. per min. Longitudinal movement is 4 in. The change gears are mounted on spline shafts and are held by retainers on the gear compartment door.

Either of two spindle speed ranges may be had: 160 to 3540 r.p.m., or 107 to 2340 r.p.m. in 16 steps, drive being by V-belt and cone pulleys, either direct or through reduction gears. Cutters down to the smallest end mills can be used. Anti-friction bearings are used throughout the spindle drive.

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LOCOMOTIVE frame taper bolts 2 in. diameter by 12 in. long are machined complete in 1½ min. with this new attachment on Gisholt turret lathes.

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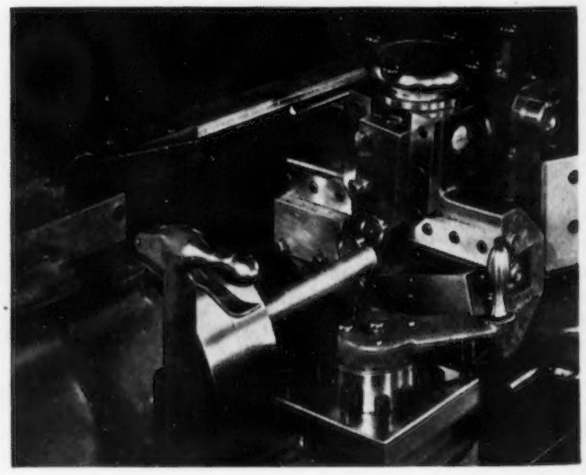


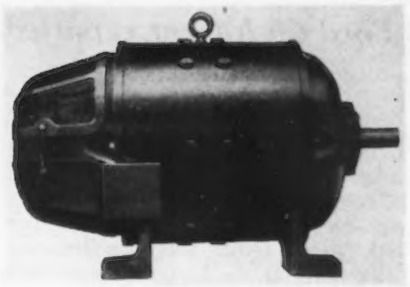
50 PER CENT longer table feed and double the power to the spindle is found in the new model MM-5 U. S. Multi-Miller, as compared with model MM-1 introduced last December.

Spindle has a vertical adjustment of 6 in. and traverse of 2 in. by handwheels. There is also hand adjustment of the table through a crank, with electrical interlock on the power feed.

MM-5 Multi-Miller is a new size of the high speed production millers made by the *U. S. Tool Co., Inc.*, Ampere, East Orange, N. J., for small part manufacture. Compared with the original MM-1 model, described in the Jan. 13 issue of THE IRON AGE, p. 38, the table feed has been increased from 4 to 6 in. and the power has been increased from ½ to 1 hp. for the spindle drive motor. Otherwise the same general design features have been maintained, including cam control of the counterweighted table. Like the smaller size also, the new unit is specifically designed for climb milling as well as conventional milling.

Planer Drive Motor

MUCH lower speeds are found in an improved design of reversing motor drive for planers, made by the *Reliance Electric & Engineering Co.*, Cleveland, and because there is less stored energy in the armature, it stops and starts quicker at the end of each stroke. Armature speeds are now 150-600 r.p.m. and 100-600 r.p.m., as against former standards of 250-1000 r.p.m. and 200-600 r.p.m. Operating comparisons indicate that the moderate added cost of the quicker acting motor will be returned by savings made within a year, due to reduced cutting time.



BALL bearing type T Reliance d.c. reversing motor for planer drive has low armature speeds for quick starting and stopping (low inertia effects)

Improvements in the control equipment include a new pendent control station with extra buttons. The master reversing switch on the planer bed has been made direct acting to speed up its operation. The rheostat panel for control of cutting and return speeds is now in a separate unit for mounting within easy reach.

A TWO - POWER magnifying glass of simple design mounted in the same fixture with a 15-watt lamp is being offered by Continental Machine Specialties, Inc., Minneapolis, for use with its Doall contour sawing and filing equipment. The device provides additional illumination and doubles the size of the layout line on close work. The lens is 2 x 3¾ in. and adjustment for position is made with a double lock clamp. The lamp is ball jointed.

..GREAT BRITAIN..

. . . Steel cartel meets in London this week; will discuss prices.

LONDON, Sept. 7 (*By Cable*).—The Continental steel position is unchanged. Business is still slow under influence of the European political situation, and consumers are looking for lower prices.

The joint coordination committee of the Steel Cartel meets in London this week when the price question is expected to be discussed. The Thin Sheet Cartel meets in London on Thursday.

More active conditions in the British iron and steel market are now expected but so far there is little indication of real revival. Steel demand is improving slowly. Shipbuilding orders are still scarce, but the demand for constructional and building steel is distinctly better, and sectional mills are better occupied. The export steel market is still quiet with sheets especially in poor demand.

Pig iron stocks are still large and liquidation is likely to occupy some months. Stocks of basic pig iron at furnaces and steel works are estimated at about 800,000 tons.

British scrap interests are considering fourth quarter scrap prices this week. It is uncertain whether there will be reductions, though a large supply coupled with poor demand seems to warrant some adjustment.

Tin plate demand is improving slowly especially for prompt and early delivery, but unfilled orders are only a trifle under 2,250,000 base boxes. Consumers are wanting lower prices but reductions are improbable as steel costs are unrelieved this year.

THIS WEEK ON THE ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

. . . 1939 auto sales get start . . . Independent to announce price cuts . . . Production increases to 22,165 units with rise on the way . . . Ford 60 hp. car reported dropped.

DETROIT. — As predicted here last week, automobile companies have already begun the sale of 1939 models and are displaying their products to the public. In particular, Plymouth is off to a fine running start with displays in dealers' salesrooms and at the Michigan State Fair attracting hundreds of visitors. Deals being closed now are for delivery about Sept. 20, seven weeks before official exhibitions at the Auto Shows.

Dealers report favorable public reaction to the new lines and an increasing flow of orders, unusual at this early date. Other Chrysler lines are being put on display throughout the country as rapidly as cars are manufactured. Prices have not been announced, although customers are assured that the price will not be higher than last year.

One independent is making plans to set the pace with a 1939 price which will be $190 less than the 1938 price announced last fall. None of the major producers can be expected to go this far with price reductions, but substantial ones are predicted, nevertheless.

A healthy increase in production was felt last week as three important concerns moved into the 1939 bracket. A total of 22,165 units was assembled last week, according to Ward's Automotive Reports. This is a good gain over the previous week's 18,700 jobs and compares with an output of 64,200 cars and trucks a year ago. Buick, Plymouth and Packard are credited with increases, while Ford began to taper off for a shutdown on Sept. 15. The figures:

	Aug. 22-26	Aug. 29-Sept. 2
Ford	14,000	13,250
Plymouth ..	1,950	4,600
Buick	727	1,500
Packard ...	——	500

Further increases by Plymouth, Buick and Packard are expected to outbalance anticipated reduction next week by Ford.

Sales Increase Expected

A 25 to 35 per cent increase in automobile sales during the ensuing year has been predicted by William S. Knudsen, president of General Motors Corp., and Richard H. Grant, vice-president, who thus place themselves in a conservative position regarding next year's prospects. If their estimate is correct, the 1939 total will be about 3,000,000 cars, compared with about 2,250,000 for the current year. Another estimate has put next year's prospects at 2,750,000 to 3,500,000 (Assembly Line, Aug. 25).

Approximately 1000 tons of structural steel will be placed shortly by Buick for the construction of a large new factory building at Flint for service parts manufacture, storage and shipping. More than 350,000 sq. ft. of space will be provided. The new structure will replace two buildings

SUBSTITUTION of steel window frames for the customary one-piece door and window construction has contributed largely to increased visibility in the Cadillac Sixty Special. Shadows on the screen illustrate the improvement through the change in door and window design and through the use of wider and higher windshield. The light gray area is obstructed in the conventional sedan, but only the dark area is obstructed in the Sixty Special. C. V. Crockett, Cadillac engineer, is shown pointing to the "shadow graph."

Large or small

Keller Machines make Accurate Tools . . . On Time . . . . . at Minimum Cost . . .

THE LARGEST Keller machine, weight 154,000 lbs., is shown producing dies for all steel tops. Machines of this and somewhat smaller sizes have accounted year after year for the production of the automotive industry's body die requirements. Progress has demanded accurate tools produced without limitations on design, completed on time to meet manufacturing schedules and finished at minimum cost. The universal adoption of the large Keller machines has made possible this progress.

In the same way the smaller Keller Automatic Toolroom Machines make progress and profits in other fields. They are ideal for the production of blanking and forming, die casting and drop forging dies, plastic molds, metal patterns and core boxes, cams and templates. Where multiple cavities are required further economies may often be secured by the production of three impressions simultaneously. But even where there is no repetition, no duplication, the Keller machine shows numerous advantages and economies. Large or small manufacturer, parts producer or jobbing shop, we can show you how the Keller method can help your business.

Pratt & Whitney
DIVISION NILES-BEMENT-POND CO.
HARTFORD • CONNECTICUT

KELLER SALES DEPARTMENT

now outmoded and of insufficient capacity to meet present requirements, according to Harlow H. Curtice, president. One of the buildings to be razed was formerly Imperial Wheel Works, one of Flint's first buggy plants. New railroad track, shipping docks and a bridge for interplant traffic over railroad tracks will be required.

Improved Visibility in New Car

A hint as to what is coming in the new models can be gleaned from examination of the Cadillac Sixty Special. Besides being *sans* running boards (as some other cars will be in 1939), the Sixty Special has greatly improved visibility through a new type of window and door construction. Cadillac engineers recently completed "shadow-graph" tests to determine the increased visibility over the conventional sedan design. In these tests, shadows cast on a screen by lights placed inside several cars in the position of the drivers' eyes were compared.

Besides having higher and wider windshield, the Sixty Special has a new type of window that reduces the width of pillar obstructions. Instead of a one-piece door and window frame, doors of the Cadillar Sixty Special end just above the belt line. Windows are carried in narrower chrome frames, with construction somewhat similar to that used in a convertible car.

Actual glass area gains over conventional sedans are:

Windshield	*27* per cent
Front door.....	53 per cent
Rear door.....	33 per cent

Reduction in the width of the windshield pillars results in a 60 per cent improvement in visibility. Objects 9 ft. wide can be "blocked out" by the average sedan windshield pillar in sighting 100 ft. away from the driver. The Cadillac Sixty Special is said to obscure a strip only 3½ ft. wide at the 100 ft. distance.

Crosley Drops Midget Car

Crosley's midget car, which a few months ago seemed certain to be built this year, is out of the picture. Four experimental models were built in Cincinnati, it has been learned, but excessive costs and the necessity of building a new dealer organization to handle the product has cause the entire plan to be dropped. When the project seemed most active, space was cleared in a plant at Richmond, Ind. Many thought that assembly operations would be carried on there. It turns out now that a special batch of refrigerators for South American delivery was produced in the cleared floor space—a far cry from midget autos.

Latest word from Ford Motor Co. is that the 60 hp. car will be dropped from the line next year. The decision is said to be final. If this proves to be true, it represents the tested opinion of the most important manufacturer of lighter cars; it seems to indicate that there simply isn't a market for such a car in quantities large enough to make the business profitable. Either Americans are so used to performance and speed that they will not slide back on the scale to save a few dollars, or they feel that they must "keep up with the Joneses." But, after all, the buyer of a low priced car is concerned not so much with the cost, as with the size of the payments.

Despite this evidence, Hupp Motor Car Corp., as reported here last week, is planning to build two new lines of cars, lighter than its present six and eight cylinder cars.

You can look for an announcement some day this week from Graham regarding a new financial set-up which will give the company cash assets three times greater than its current liabilities. The company will make a strong bid to regain solid footing during the next year. It is making strenuous efforts to strengthen and revivify its sales organization. Several times in the past it has been unfortunate in its selection of time for similar efforts. The company officials believe that it is in a good position to go ahead now. Its design, radical last year, is confirmed now by the fact that other designs are being copied from it. It can still be said that lines of the Graham car are two years in advance of much of the automotive field. Unusual price set-up and relatively heavy expenditures for publication advertising should assist materially toward success.

The car for 1939 will not be greatly changed from last year, one of the most noticeable (or is it?) changes being the absence of running boards. A gear shift, operated from the steer-

(CONTINUED ON PAGE 82)

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THE OLD SCHOOL

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	July 1938	June 1938	July 1937	Seven Months 1937	Seven Months 1938
Steel Ingots: (gross tons)					
Monthly output[a]	1,982,058	1,638,277	4,556,304	33,315,264	12,801,202
Average weekly output[a]	448,429	381,883	1,030,838	1,099,868	422,610
Per cent of capacity[a]	33.42	28.46	78.48	83.74	31.75
Pig Iron: (gross tons)					
Monthly output[b]	1,201,785	1,062,021	3,498,858	23,205,451	9,074,811
Raw Materials:					
Coke output[c] (net tons)	2,220,212	2,118,330	4,707,106	32,226,934	17,440,658
Lake Ore consumed[d] (gross tons)	1,674,721	1,471,660	5,236,487	34,610,436	12,391,008
Castings: (net tons)					
Malleable, orders[e]	16,905	18,143	41,353	376,211	129,525
Steel, orders[e]	.....	21,074	57,799	669,989	.....
Finished Steel: (net tons)					
Trackwork shipments[a]	2,242	2,942	8,252	66,260	22,220
Fabricated shape orders[f]	87,154	99,899	158,341	1,077,140	577,254
Fabricated plate orders[e]	27,773	20,044	27,480	278,725	174,217
U. S. Steel Corp. shipments[g]	441,570	478,057	1,186,752	8,801,026	3,451,924
Fabricated Products:					
Automobile production[h]	150,444	189,399	456,909	3,373,778	1,456,476
Construction contracts[i]	$239,799‡	$251,006‡	$321,603‡	$1,815,254‡	$1,534,071‡
Steel furniture shipments[e]	$1,480‡	$1,591‡	$2,164‡	$16,508‡	$11,580‡
Steel boiler orders[e] (sq. ft.)	691,371	547,426	996,212	6,515,079	4,123,313
Locomotives ordered[j]	3	31	3	231	78
Freight cars ordered[j]	0	1,091	1,030	46,120	8,024
Machine tool index[k]	89.6	70.2	171.1	190.5	75.5
Foundry equipment index[l]	74.2	61.2	204.0	224.7	76.0
Exports: (gross tons)					
Total iron and steel[m]	263,699	312,021	889,478	4,432,153	3,179,378
All rolled and finished steel[m]	100,671	117,590	224,151	1,119,237	821,037
Scrap[m]	125,399	160,577	420,097	2,554,862	1,910,771
Imports: (gross tons)					
Total iron and steel[m]	14,728	15,887	47,012	344,626	133,713
Pig iron[m]	936	900	8,310	68,175	21,301
All rolled and finished steel[m]	11,130	13,205	24,637	187,034	92,620
British Production: (gross tons)					
Pig iron[n]	570,800	541,500	729,300	4,740,300	4,513,200
Steel ingots[n]	683,200	776,100	1,059,200	7,397,600	6,609,700

† Three months' average. ‡ 000 omitted.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary figures from the Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; [i] F. W. Dodge Corp.—37 Eastern states; [j] *Railway Age;* [k] National Machine Tool Builders Association; [l] Foundry Equipment Manufacturers Association; [m] Department of Commerce; [n] British Iron and Steel Federation.

Weekly Booking of Construction Steel

	Week-Ended				Year to Date	
	Sept. 7, 1938	Aug. 30, 1938	Aug. 9, 1938	Sept. 7, 1937	1938	1937
Fabricated structural steel awards	26,510	21,600	17,350	24,400	518,830	815,065
Fabricated plate awards	120	4,410	4,485	925	95,450	88,435
Steel sheet piling awards	3,000	500	0	105	33,910	36,225
Reinforcing bar awards	9,520	5,525	11,830	3,200	208,305	196,375
Total Letting of Construction Steel	39,150	32,035	33,665	28,630	856,495	1,136,100

THIS WEEK IN WASHINGTON

. . . Labor Commission in visit to England finds no strong-arm picket lines, few strikes, mutual acceptance of collective bargaining and employers favoring strong unions . . . Contracts Board ruling on steel wages likely to be held up until after Sept. 15.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON. — President Roosevelt's nine-member commission which surveyed labor-employer relations in Great Britain—a study in which CIO Chairman John L. Lewis declined CIO participation—reported to the White House last week that violence on the part of workers and provocative tactics by employers have for some time played no significant part in industrial disturbances in Great Britain and that the country relies chiefly for the maintenance of industrial peace upon voluntary collective bargain machinery rather than on legal compulsion or legislation.

Describing the British collective bargaining process as "intricate" and of a "diverse nature," the comprehensive report traces the development of labor unions since 1825 up through the present era, and points out that "collective agreement," negotiated by employers associations and unions as integral parts of the collective bargaining machinery, have proved highly successful because they rest on "moral force rather than on legal compulsion."

Legal Sanctions Undesirable

"We could find no desire on the part of either employers associations or unions to seek legislation which would make the voluntary agreements legally enforceable," the President was told in the report. "On the contrary, perhaps the chief characteristic of the attitudes of both groups is that legal sanctions for these agreements are undesirable, and that the agreements should rest upon mutual understanding and good faith."

Members of the committee, designated on June 16 by President Roosevelt who said he saw a definite need for an impartial report on the subject, made no attempt in the report to draw parallel lines between conditions in Great Britain and this country but merely confined their statement to a factual report on conditions as they found them. Neither did they make any recommendations.

Mr. Roosevelt in naming the commission said the purpose of the survey was to clear up a great deal of misunderstanding concerning the British law rather than to use the material as a basis for revising the Wagner Act but the CIO promptly criticized the move, insisting it would not be a party to any cover to attack the National Labor Relations Act. The survey has frequently been coupled with reports that the Administration was ready to propose Wagner Act amendments although the Administration is expected to shy away from such a move when it comes to a final showdown.

"Job Belongs to Man"

The committee said that since collective bargaining became generally accepted there have been few strikes. Where strikers involved enough workers to make continued operation impractical, the report explained, employers "almost invariably shut down their plants and do not attempt to operate until the controversy has been settled by negotiation." Reasons cited by the committee were that in strongly organized industries it is difficult to obtain replacements and that even where organization is slight there is a general feeling among workers and employers that "the job belongs to the man" and "that it is not right for men to take, or to be asked to take, the jobs of their fellows." In the final analysis, confidence on both sides in peaceful negotiations means there is a minimum of bitterness and it follows that discrimination against strikers and strike leaders is almost wholly eliminated, the report continued.

Where strikes involve only a portion of a plant, the unaffected sections may continue operations, the men on strike are not replaced, order is preserved and "men are not forcibly prevented by picket lines from going to or coming from their work," the President was told. "To most of the union officials, and to the employers and their representatives with whom we met, we put the question whether and to what extent the Act of 1927 had affected their relations, and the answer was that it had not made any difference in the processes of collective bargaining which had substantially all been established prior to the passage of the legislation."

Act's Repeal Is Sought

The Act of 1927, which the board learned was aimed at weakening the Labor Party, provides among other things that a union member must sign and file with the trade union a written notice of his willingness to make political contribution — a provision which the committee said had undoubtedly reduced the revenues of the Labor Party, which is pledged to repeal the act. Every trade union in Great Britain is required to file with the registrar annual accounts of political funds whether it is a registered or unregistered union.

In many sections of the report the general strike of 1926 was cited as an exception to an otherwise good record of handling labor disputes but the committee said it is generally believed there will be no repetition.

"The Government learned that drastic economic changes in policy should not be undertaken without the fullest consultation with both labor and employer organizations," the report declared. "Such consultation had been general throughout the war, and we were informed that today, before legislative or administrative action is taken that may affect labor, its continuity of employment, its wages, hours, cost of living, or working conditions, the views of labor and employers alike are invariably sought."

Members of the committee signing the report included Charles R. Hook, president of the American Rolling Mill Co.; Gerard Swope, president of General Electric Co.; Henry I. Harriman, former president of the United States Chamber of Commerce; Lloyd

MONARCH ANNOUNCES

NOW, after long research and experimental work, Monarch announces AUTOMATIC SIZING.

A dramatic step forward in lathe development and another of the long list of Monarch "firsts", AUTOMATIC SIZING has many outstanding advantages:

1. Makes an engine lathe or a tool room lathe an automatic machine for the accurate duplication of parts when run in small or large lots;
2. Greatly increases the output per lathe on duplicate work . . . in the time saved in measuring diameters and lengths necessary with manual control;
3. Makes it possible for one operator to handle two or more lathes on most work, thereby reducing production costs;
4. Results in the shortest "set-up" time of any automatic machine yet developed;
5. Functions with equal accuracy and efficiency in turning, boring and facing;
6. Makes possible the turning, boring or facing of two directional contour and taper work.

Each AUTOMATIC SIZING lathe is really two lathes in one; an *automatic lathe* and a *regular standard engine lathe* or tool room lathe. It can be changed from one to the other type in one minute's time. *Bulletin Now Ready.*

THE MONARCH MACHINE TOOL CO.
Sidney, Ohio, U.S.A.

MONARCH LATHES
COVER THE TURNING FIELD

Newark Sales Office: 1060 Broad Street • Pittsburgh Sales Office: 604 Chamber of Commerce Bldg. • Chicago Sales Office: 622 W. Washington Boulevard • Indianapolis Sales Office: 3115 North Meridian Street.
Agencies in principal industrial centers of this and foreign countries.

Monarch Lathes are Equipped with the American Standard CAMLOCK Flange Type Spindle Nose

MAKE MORE GOODS FOR MORE PEOPLE AT *FAR LESS COST!*

K. Garrison, Wisconsin Law School dean and former chairman of the old National Labor Board; Robert Watt, American representative at the International Labor Office at Geneva; the AFL representative; William H. Davis, New York attorney and former NRA Deputy Administrator; William Ellison Chalmers, assistant United States labor commissioner at Geneva; Mrs. Anna M. Rosenberg, regional director, Social Security Board, New York; and Miss Marian Dickerman, principal of the Todhunter School, New York.

President Roosevelt, who expressed his appreciation of the commission's work, suggested when he released the report to the press that it ought to be read through.

"To me," he said, "the most salient feature of it, is the cooperative spirit coupled with restraint which is shown by those who represent both employers and employees in Great Britain. Collective bargaining is an accepted fact and because of this the machinery which carries it out is functioning."

While there was much in the report to which the CIO could take vigorous exception and interpret as a reflection on their activities, there were also paragraphs which it could cite as bolstering its industrial union principle. For example, the report said there are three types of unions in Great Britain; the craft union, the industrial union and the general unions —a combination of unskilled workers and craft workers in unorganized areas, and that the acceptance and general practice of collective bargaining on "an industry basis" places upon the employer and worker organizations, due to the sheer numbers of men and the magnitude of interest involved, a heavy responsibility calculated to call forth patience, understanding and a desire to make and keep agreements and to achieve industrial peace.

Strong Unions Favored

Employers repeatedly informed the committee, the report asserted, that they preferred strong unions to weak ones and likewise the labor representatives said they preferred strong employer organizations, because the stronger the organization the fewer the units which remain outside to undermine industry standards.

More significance has been attached to the report because of the CIO opposition than because of any concrete evidence that it would actually lead to Wagner Act revision. Aside from refusing to name a CIO representative on the commission, the John L. Lewis organization later charged in the CIO organ that the study had first been suggested by Board Chairman Tom Girdler, of Republic Steel Corp., who, the CIO paper said, had approached Mr. Hook, president of the NAM, and asked for aid in financing the project.

Sweet's Steel Co. reported a loss for the 26 weeks ended July 2, 1938, of $3,299.26 after all charges and after charging off $25,923 depreciation on buildings, machinery and equipment. The volume of sales, amounting to $655,510.54, during this period was approximately 30 per cent less than for the same period of 1937. Plant operations were approximately 51 per cent of normal capacity.

Buffalo Scale Co., Inc., Buffalo, has opened a branch office at 649 Whitehall Street, S.W., Atlanta, under the management of G. E. Daub. In addition to carrying a complete line of Buffalo scales and Fairbanks trucks, the new branch will have a service department for the repair and adjustment of scales.

Public Contracts Board Steel Wage Ruling Seen After Sept. 15

WASHINGTON. — President Roosevelt was asked at a press conference last Friday about his reaction to talk of wage reductions in the steel industry and by the railroads. In the case of steel, he merely said the subject had been touched on in a general way during the visit last week of SWOC Chairman Philip Murray, but only in connection with a discussion he said he had with the labor representative on the subject of friendly settlement of labor disputes. Referring to the railroad situation, Mr. Roosevelt expressed the hope that the current controversy over wage reductions could be worked out satisfactorily.

Mr. Murray told the President on Aug. 31, that the likelihood of wage reductions in the steel industry has diminished with the rise in operations.

The President's conference with Mr. Murray was mentioned after Mr. Roosevelt was asked what sections of the Great Britain labor relations survey could be made applicable in this country since England's apparent success is based on "a state of mind." The President said he hoped this country would gradually attain that state of mind, but that in the interim the press ought to avoid the overplaying of labor disputes and both sides in a labor controversy ought to refrain from calling names.

Wage Report Deferred

Meanwhile, the Public Contracts Board's study of steel wage rates is requiring more time than had first been anticipated with the result that its report has been deferred. Chairman Thomas Holland indicated last Friday that the report will be delayed somewhat beyond original estimates which fixed the date around Sept. 15.

Mr. Holland said that material taken from oral testimony at the public hearings, including tables and other factual data, has been prepared as a memorandum from which to write a final report after checking for accuracy of the material. Also, a complete check of companies listed as coming under the iron and steel case is being made in order to determine whether they actually should be included.

It has been found, for instance, that a number of companies which had been asked to attend the hearings are foundry operators. These will be stricken from the list since foundries are not affected by the iron and steel case. On the other hand, it is understood that the board had omitted a steel concern or so which ultimately will be embraced within the proceedings.

But the big problem which is said to perplex the board is the method of determining wage rates. The belief continues to prevail that the board would like to freeze wages. This would mean that there would be varying rates in given areas, with the small companies permitted to pay less than the larger ones.

However, there is the legal question

of whether wage rates can be fixed according to the size of a plant. The matter was taken up by the board with the Labor Department's solicitor and it is reported that he gave a "tentative" opinion that the Walsh-Healey Act does not permit such differentials, but that a common wage rate must be fixed for specified localities. This was the view of steel counsel at the hearing. The solicitor is reported to have conferred with Labor Secretary Perkins on the matter after he had rendered his opinion because of doubt in his own mind.

Find Conflict in Law

The law apparently is conflicting. Section 1 (b) provides for "the prevailing minimum wages for persons employed on similar work or in the particular or similar industries or group of industries currently operating in the locality in which the materials . . . are to be manufactured." This provision generally is taken to mean that there can be only one wage rate in a given locality. Yet Section 6 permits variations and exemptions, and this has given rise to the view that different rates may be fixed for a given area. Some think the section offers the way out to freeze steel wages or to fix them according to size of plant.

A provision in Section 6 says:

"The Secretary of Labor may provide reasonable limitations and may make rules and regulations allowing reasonable variations, tolerances and exemptions to and from any or all provisions of the act respecting minimum rates of pay and maximum hours of labor or the extent of the application of this act."

Steel, Auto Wages High, E. F. Andrews Says

WASHINGTON. — Elmer F. Andrews, wage-hour administrator, said last week that the steel and automobile industries will not be considered in connection with the Fair Labor Standards Act for "a long time to come" because of the comparatively high rates of wages paid in these industries. The American Iron and Steel Institute has asked him to speak at a forthcoming meeting.

The Fair Labor Standards Act, which becomes effective Oct. 23, prescribes a mandatory minimum wage for interstate industries of 25c. an hr. and maximum hours of 44 the first year, but rates 40c. an hr. and 40 hr. per week could be fixed immediately if an industry committee so recommended.

Cooperative Tractor Plant To Expand Its Capacity

WASHINGTON. — Work will start soon on the construction of an addition to an existing plant at Arthurdale, W. Va., for the assembly of farm tractors. It will be operated by four Midwest wholesale cooperatives to which the facilities have been leased by the Arthurdale Association, an organization of homesteaders. For the purpose of constructing the plant the association has been granted a loan of $325,000 by the Bond Security Administration of the Department of Agriculture.

The lease provides for the management of a farm equipment plant so that operations can be extended to the assembly of any kind of farm implement but present plans contemplate assembly of farm tractors. Parts will be purchased from established commercial producers. The plant will replace the one formerly managed by the same cooperatives at Battle Creek, Mich. The contract for operating the Battle Creek plant has recently been terminated.

F. E. Myers & Brother Co. Pays Bonus to 500 Employees

CLEVELAND.—A 5 per cent bonus will be paid to 500 employees of the F. E. Myers & Brother Co., Ashland, Ohio, Oct. 20. The bonus is to be based on each employee's pay from Oct. 1, 1937, to Oct. 1, 1938. Last year the bonus amounted to 7½ per cent of the year's wages.

The company manufactures pumps, auto washers and diversified steel products.

Electric Auto-Lite Has Large Bumper Contracts

TOLEDO.—The Electric Auto-Lite Co. has announced new bumper contracts sufficient to fill to capacity its Buckeye bumpers division plant at Springfield, Ohio. It has booked a larger percentage of Chrysler bumper business than last year.

C. O. Miniger, chairman of the board, announced that the company now has 2000 employees at work in its main plants in Toledo.

..PERSONALS..

L. I. BARKER, formerly manager of sales of the Cleveland district office of the Union Drawn Steel Division of Republic Steel Corp., Cleveland, has been appointed assistant manager of sales, with headquarters at Massillon, Ohio. Mr. Barker takes over the duties of R. B. Barnett, who is leaving Union Drawn to assume the management of the Buffalo office of Peter A. Frasse & Co., Inc. A. G. C. QUAY, heretofore a member of the sales force in the Cleveland office, succeeds Mr. Barker as Cleveland district sales manager. Mr. Barker was formerly identified with the Carnegie Steel Co., and began his association with the Union Drawn Steel Co. in 1923 as a salesman in the Cleveland district office. He was made manager of that office in 1929. Mr. Quay joined the Union Drawn Cleveland office in 1927.

FRANK H. STOHR has been appointed manager of the newly combined transportation and generator divisions of Westinghouse Electric & Mfg. Co., with headquarters at East Pittsburgh. He has been associated with Westinghouse since 1922 when he joined the students' course immediately after graduation as an electrical engineer from the University of Iowa. In 1926 Mr. Stohr was made manager of the generator section and in 1931 was appointed manager of the combined generator and substation sections. He

L. I. BARKER

A. G. C. QUAY

later became sales manager of the generator division and last December was made manager of that division.

FRANK B. POWERS has been appointed engineering manager of the combined transportation and generator divisions. He attended both engineering and design schools while in the Westinghouse graduate student course after graduating from the University of Chicago. In January, 1935, Mr. Powers was promoted to section engineer of all direct current traction motors and later was appointed manager of engineering of the transportation department.

F. H. STOHR

F. B. POWERS

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I. F. ROBERSON has been named manager of the new Cleveland branch of Owens-Illinois Can Co. Formerly he was general manager of the can division of the W. F. Robertson Steel & Iron Co., Springfield, Ohio.

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H. D. LAIDLEY, for several years associated with large electric appliance makers, has been named vice-president in charge of sales of the Standard Electric Mfg. Corp., Toledo, Ohio.

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FRANK D. WINSLOW, who has been engaged in sales work for a number of steel companies since his graduation from the University of Nebraska in 1920, has been made district sales manager for the Southwest, of the newly-opened, Houston office, by the Jones & Laughlin Steel Corp., Pitts-

burgh. CURT C. NOEL, district sales representative, is to be in charge of the Dallas branch office. He has been identified with Jones & Laughlin in the Southwest for many years.

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EARL L. BROKENSHIRE, sales manager, Oglebay, Norton & Co., Cleveland, will celebrate the 30th anniversary of his association with the company on Sept. 9. Starting as an office boy, he served in virtually all departments of the concern prior to his present office. During the World War Mr. Brokenshire managed the company's vessel operations.

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T. W. MARZ has been appointed purchasing agent of the Andrews Steel Co., Newport Rolling Mill Co., Globe Iron Roofing & Corrugating Co., and Newport Culvert Co., Newport, Ky., succeeding the late R. K. Boggs.

FLOYD T. HAGUE has been appointed manager of engineering of the steam division at the South Philadelphia works of Westinghouse Electric & Mfg. Co. He formerly was manager of the d. c. engineering department

F. D. WINSLOW

E. L. BROKENSHIRE

at East Pittsburgh. Mr. Hague joined the engineering department of Westinghouse after graduating from Western University of Pennsylvania in 1911. In 1925 he was placed in charge of d. c. machines and synchronous converters, the scope of his duties later being extended to cover automobile parking elevators, induction regula-

tors, industrial furnaces and various special types of machines.

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CARLTON S. STURDY, of the American Can Co., New York, will address the Steel Club of Baltimore at its fall dinner meeting Friday, Sept. 9, at the Lord Baltimore Hotel, on the subject, "What Is Behind the Label." Officers of The Steel Club of Baltimore are: President, CHARLES S. DUVALL, Maryland Bolt & Nut Co.; vice-president, C. H. MICHEL, Maryland Metal Building Co.; secretary-treasurer, H. R. DORNEY, Jones & Laughlin Steel Corp.

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HERMAN W. FALK, president of the Falk Corp., Milwaukee, has been elected a director and a member of the executive committee of the Allis-Chalmers Mfg. Co., Milwaukee. He is a brother of Gen. Otto H. Falk, formerly president and now chairman of the board of directors of the Allis-Chalmers firm.

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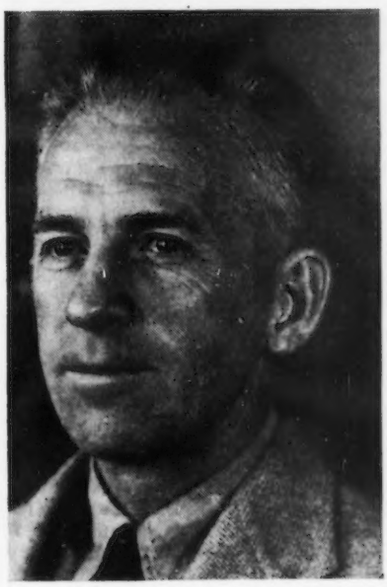
ERNEST COOKE, representative of the Allis-Chalmers Mfg. Co., Milwaukee, at Sydney, Australia, has been spending some time at the head office, mainly in connection with the tractor and farm implement division as well as the industrial tractor department.

F. T. HAGUE



E. W. SCHELLENTRAGER who, as announced in these columns last week, has been elected vice-president of Atlas Car & Mfg. Co. and Atlas Bolt & Screw Co., Cleveland. For many years Mr. Schellentrager has been chief engineer of car manufacturing.

Over 230 Exhibitors Sign For Metal Congress Space

MORE than 230 exhibitors, ranging from the steel and non-ferrous metal manufacturers to makers of furnaces, welding equipment and lock washers, have signed for show space at the Twentieth National Metal Congress, to be held in Detroit, Oct. 17 to 21, according to W. H. Eisenman, managing director. Many steel manufacturers will exhibit for the first time, and practically all of the previous steel exhibitors will be in again. That the industry in general is looking toward the fall with considerable optimism is evidenced by the size and scope of exhibits planned. The latest list of exhibitors is as follows:

Acme Steel Co.
Aetna-Standard Engineering Co.
Air Reduction Sales Co.
Ajax Electrothermic Corp.
Ajax Electric Co., Inc.
Ajax Metal Co.
Allegheny Steel Co.
Edgar Allen Steel Co.
Alox Corp.
Aluminum Co. of America, Inc.
American Brass Co.
American Bridge Co.
American Car & Foundry Co.
American Chain & Cable Co.
American Cyanamid & Chemical Corp.
American Electric Furnace Co.
American Foundry Equipment Co.
American Gas Association
American Gas Furnace Co.
American Institute of Mining and Metallurgical Engineers
American Machine & Metals Mfg. Co.
American Machinist
American Manganese Steel Co.
American Metal Market
American Rolling Mill Co.
American Screw Co.
American Sheet & Tin Plate Co.
American Steel & Wire Co.
American Welding Society
Ampco Metal, Inc.
Anderson & Sons
Arcos Corp.
Armstrong Blum Mfg. Co.
Armstrong Cork Products Co.
Atlas Foundry Co.
Audubon Wire Cloth Corp.
Automatic Gasflux, Inc.
Babcock & Wilcox Co.
Baldwin-Southwark Corp.
W. O. Barnes Co., Inc.
Barrett-Cravens Co.
Bastian Blessing Co.
Bausch & Lomb Optical Co.
Bellevue Industrial Furnace Co.
Bellis Heat Treating Co.
Bethlehem Steel Co.
Black & Decker Mfg. Co.
Blakeslee & Co., G. S.
Botfield Refractories Co.
Bradley Washfountain Co.
Bristol Co.
Braeburn Alloy Steel Corp.
Brown Instrument Co.
A. I. Buehler
Carboloy Co., Inc.
Carborundum Co.
Carnegie - Illinois Steel Corp.
Carpenter Steel Co.
Chapman Valve Mfg. Co.
Chase Brass & Copper Co.
Chilton Co.
Climax Molybdenum Co.
Columbia Steel Co.
Continental Industrial Engineers, Inc.
Continental Machine Specialties, Inc.
Contract Welders, Inc.
Crucible Steel Co. of America
Cyclone Fence Co.
Crown Rheostat & Supply Co.
Dayton Rogers Mfg. Co.
de Sanno & Sons, A. P.
Despatch Oven Co.
Detroit Electric Furnace Co.
Detroit Rex Products Co.
Detroit Testing Machine Co.
Dickinson-Sterling Co.
Dietert Co., Harry W.
Dow Chemical Co.
Driver-Harris Co.
E. I. duPont de Nemours & Co.
Grasselli Division
R & H Chemicals Department
Rubber Chemicals Division
Eclipse Fuel Engineering Co.
Electric Furnace Co.
Electro Alloys Co.

Electro Metallurgical Co.
Ensign-Reynolds, Inc.
Federal Products Corp.
A. Finkl & Sons Co.
Firth Sterling Steel Co.
J. B. Ford Sales Co.
Foxboro Co.
Fitzsimons Co.
Gas Machinery Co.
Gathmann Engineering Co.
General Alloys Co.
General Electric Co.
General Electric X-Ray Corp.
Globar Division of Carborundum Co.
Great Lakes Steel Corp.
Claud S. Gordon Co.
Halcomb Steel Co.
Handy & Harman
Harnischfeger Corp.
Hauck Mfg. Co.
C. I. Hayes, Inc.
Haynes-Stellite Co.
Heat Treating and Forging
Heppenstall Co.
Hevi Duty Electric Co.
Hobart Brothers Co.
A. F. Holden Co.
Hollup Corp.
Charles A. Hones, Inc.
Hoskins Mfg. Co.
E. F. Houghton & Co.
Illinois Testing Labs., Inc.
Industrial Heating Equipment Co.
Industrial Publishing Co.
International Nickel Co., Inc.
The Iron Age
Jackson Electrode Holder Co.
Johns-Manville Corp.
Jones & Laughlin Steel Corp.
J. W. Kelley Co.
M. W. Kellogg Co.
C. M. Kemp Mfg. Co.
Krembs & Co.
Krouse Fatigue Testing Machine Co.
LaSalle Steel Co.
Latrobe Electric Steel Co.
Lava Crucible Co.
Leeds & Northrup Co.
E. Leitz, Inc.
Lepel High Frequency Labs.
Lincoln Electric Co.
Lindberg Engineering Co.
Linde Air Products Co.
Ludlum Steel Co.
Luers, J. Milton
Machinery
Macklin Co.
Magnaflux Corp.
Magnetic Analysis Corp.
Mahr Mfg. Co.
P. R. Mallory & Co., Inc.
Manganese Steel Forge Co.
Manhattan Rubber Mfg. Co.
Marburg Brothers, Inc.
Marquette Mfg. Co.
Maurath, Inc.
McKay Co.
Metal Industry
Metal & Thermit Corp.
Metals & Alloys
Metals Disintegrating Co.
Metlab Co.
Michiana Products Corp.
Michigan Steel Casting Co.
Midvale Co.
A. Milne Co.
Modern Machine Shop
Molybdenum Corp. of America
Monarch Steel Co.
National Cylinder Gas Co.
National Electric Welding Machines Co.
National Industrial Publishing Co.
National Tube Co.
New Jersey Zinc Sales Co.
Norton Co.
Oakite Products, Inc.
Ohio Crankshaft Co.
Ohio Steel Foundry Co.
Olsen Testing Machine Co., Tinius
Pangborn Corp.
Park Chemical Co.
Parker Kalon Corp.
Parker Rust Proof Co.
Partlow Corp.
George F. Pettinos, Inc.
Production Machine Co.
Products Finishing
Progressive Welder Co.
Pyro Electric Instrument Co.
Pyrometer Instrument Co.
Quigley Co., Inc.
Reeves Pulley Co.
Republic Steel Corp.
Robinson Welding Supply Co.
Rustless Iron & Steel Corp.
Joseph T. Ryerson & Son, Inc.
George Scherr Co., Inc.
F. E. Schundler & Co., Inc.
Scully Steel Products Co.
Selas Co.
Sentry Co.
Sleeper & Hartley, Inc.
Spencer Turbine Co.
Standard Alloy Co.
Standard Fuel Engineering Co.
Steel
D. A. Stuart & Co.
Surface Combustion Corp.
Tagliabue Mfg. Co.
Taylor-Hall Welding Corp.
Tennessee Coal, Iron & Railroad Co.
Thomas Steel Co.
Henry G. Thompson & Son Co.
Tide Water Associated Oil Co.
Titanium Alloy Mfg. Co.
Torrington Mfg. Co.
Udylite Co.
Una Welding, Inc.
Union Carbide Co.
Unitcast Corp.
United States Steel Corp.
Universal-Cyclops Steel Corp.
Vanadium Corp. of America
Victor Saw Works, Inc.
Wall Colmonoy Corp.
Welding Engineer
Weldit Acetylene Co.
Wells Mfg. Corp.
Westinghouse Electric & Mfg. Co.
Wheelco Instruments Co.
Wilcox Rich
H. A. Wilson Co.
Wilson Mechanical Instrument Co.
Wire Association
Youngstown Sheet & Tube Co.
Carl Zeiss, Inc.

. . . THE NEWS IN BRIEF . . .

Sales of 1939 automobile models get start . . . Production gains, with further rise on the way . . . Independent maker is to announce price cut. Page 56 . . . Labor Commission in visit to England finds no strong-arm picket lines, few strikes, mutual acceptance of collective bargaining and employers favoring strong unions.—Page 60.

Carboloy training schools are to be resumed—subjects include economics, design and applications of Carboloy tools. The courses are available without charge.—**Page 39.**

Wean Engineering Co., Warren, Ohio, will make and install new by-product waste acid disposal systems controlled by the Allied Development Corp. The by-product, known as Ferron, is a fireproof insulating material.—**Page 49.**

Public Contracts Board, seeking methods of determining wage rates, is puzzled by apparent conflict in Walsh-Healey Act and is likely to postpone its wage decision until after Sept. 15.—**Page 63.**

Because steel and automotive industry wages are relatively high, those industries will not be considered in connection with the Fair Labor Standards Act for a long time to come, Wage-Hour Administrator Andrews says.—**Page 64.**

Cooperative tractor plant at Arthurdale, W. Va., to expand its capacity.—**Page 65.**

A five per cent bonus is what the F. E. Myers & Brothers Co. is paying 500 employees.—**Page 65.**

2000 employees will work steady at the Electric Auto-Lite Co. They have sufficient large bumper contracts to keep the plant at capacity.—**Page 65.**

More than 230 exhibitors ranging from the steel and non-ferrous metal manufacturers to makers of furnaces, welding equipment and lock washers sign for show space at the National Metal Congress to be held in Detroit Oct. 17 to 21.—**Page 70.**

Five thousand steel plant executives and operating engineers are expected to attend the Association of Iron & Steel Engineers' 34th annual convention and iron and steel exposition at Cleveland Sept. 27-30.—**Page 75.**

The steel industry employed 424,400 workers in July and distributed $90,550,000 in payrolls.—**Page 75.**

Broad gage attitude on labor problems expressed at the twenty-first Industrial Conference held at Silver Bay, Lake George, N. Y.—to provide steady employment, adequate pay and good working conditions was the main theme.—**Page 76.**

Invitations to the 16th annual convention of the American Institute of Steel Construction, to be held Oct. 11-14 at French Lick Springs Hotel, French Lick, Ind., have been mailed to 1700 executives of structural steel fabricating shops in the United States and Canada.—**Page 80.**

Thomas S. Gassner Co. buys H. D. Dougherty & Co., manufacturer of steel hospital furniture and operating room equipment.—**Page 80.**

The 13th International Congress of Carbide, Acetylene, Oxyacetylene Welding and Allied Industries will meet in Munich June 25-July 1, 1939.—**Page 80.**

Radio sound technicians record the noises of Carnegie-Illinois Steel Corp.'s Homestead works in preparation for Allegheny County's Sesqui-Centennial.—**Page 82.**

August orders for new rolling stock totaled 303 freight cars and 18 locomotives, compared with 50 freight cars and three locomotives in July.—**Page 82.**

Machinery export business still prominent—domestic buying expected to improve during fall.—**Page 106.**

SECTIONS INDEX

CONVENTIONS

Sept. 26 to 30—Association of Iron and Steel Engineers, Cleveland.
Oct. 10 to 12—American Gear Manufacturers Association, Skytop, Pa.
Oct. 10 to 14—American Institute of Steel Construction, French Lick Springs, Ind.
Oct. 12 to 14—Porcelain Enamel Institute, University of Illinois, Urbana, Ill.
Oct. 12 to 15—The Electrochemical Society, Rochester, N. Y.
Oct. 13 to 15—Society of Automotive Engineers, aircraft production meeting, Los Angeles.
Oct. 14 to 15—American Society of Tool Engineers, Pittsburgh.
Oct. 17 to 20—American Institute of Mining and Metallurgical Engineers, Detroit.
Oct. 17 to 21—National Metals Congress, Detroit.

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...OBITUARY...

BIDDLE ARTHURS, former president and director of the Simonds Gear & Mfg. Co., Pittsburgh, died in that city on Aug. 18.

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MARTIN S. NOFFSINGER, for many years identified with the Covington Machine Co., Covington, Va., died at his home in Roanoke, Va., on Aug. 31, aged 60 years.

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VINCENT W. ALLEN, assistant works manager of the Bridgeport Brass Co., Bridgeport, Conn., died at the Waterbury (Conn.) Hospital on Aug. 25, aged 49 years. Mr. Allen, who had been connected with the brass industry for 28 years, was graduated from the Massachusetts Institute of Technology as a mechanical engineer. His first job was as master mechanic with the American Brass Co. He was later transferred to the company's plant at New Toronto, Canada, as chief engineer. In 1927 he went to Detroit as works manager of the Michigan Copper & Brass Co., Inc., and when this company was merged with the Revere Copper & Brass Co. he was made general manufacturing manager of all the company's mills. He resigned in 1932 to become identified with the Bridgeport Brass Co.

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JAMES E. PALMER, for 31 years an employee of the Inland Steel Co., Chicago, died suddenly on Aug. 26. He began work as an auditor at the Indiana Harbor plant in 1907, and was made works auditor in 1918.

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JAMES W. HARTY, retired Cleveland sales representative for the American Locomotive Co., died recently at his home in Cleveland, at the age of 70.

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GROVER E. STROHM, former sales representative of the Harrison Radiator division of the General Motors Corp., was buried Sept. 3 at Detroit. Mr. Strohm was 52 years old.

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HENRY J. LUSS, who died of a heart attack while at work at the plant of the R. C. Mahon Co., Detroit, where he was an inspecting and testing engineer, was buried Aug. 28.

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HAROLD A. IVES, assistant time study engineer for the United Steel & Wire Co., died Aug. 29 at Battle Creek, Mich.

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WALTER V. HELMEL, first vice-president of the Motor Products Corp.,

Detroit, died Aug. 30 of a heart attack while he was at work in his office. He had complained of being ill on Monday but returned to his desk Tuesday morning. Mr. Helmel was born in Joliet, Ill., on Mar. 13, 1887, and joined the Motor Products Corp. in 1916 after having been purchasing agent at the Vanguard Co. He had been a director of the Motor Products Corp. for 10 years.

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HERMAN DAVIDSON, president of the Albert & Davidson Pipe Co., Brooklyn, N. Y., died at Monticello, N. Y., on Sept. 2, aged 62 years.

Steel Industry Employed 424,400 Workers in July

EMPLOYMENT in the steel industry during July averaged 424,400 employees, and total payrolls for the month amounted to $45,802,000, according to a report of the American Iron and Steel Institute.

During June an average of 424,700 employees were at work in the industry, and payrolls totaled $46,706,000. In July, 1937, the steel industry employed 594,000 and distributed $90,550,000 in payrolls.

Average hourly earnings of the industry's wage-earning employees were 84.8c. per hr. in July, as against 84.5c. in June and 86.2c. in July of last year.

Wage earners worked an average of 24.3 hr. per week in July, compared with 25.6 hr. in June and 37.3 hr. in July, 1937.

5000 Expected To Visit A.I. & S.E. Exposition

MORE than 5000 steel mill executives and operating engineers of the steel industry are expected to attend the 34th annual convention and Iron and Steel Exposition of the Association of Iron and Steel Engineers, to be held in the Cleveland Public Auditorium, Cleveland, Sept. 27, 28, 29, and 30. A comprehensive program has been arranged for the technical sessions, which will be held in the same building as the Iron and Steel Exposition.

Twenty technical papers will be presented by leading steel mill engineering authorities on electrical, mechanical, metallurgical, combustion, lubrication and welding engineering as applied to the greater steel industry.

Broad Gaged Attitude on Labor

SUMMING up the significance of the twenty-first Industrial Conference held at Silver Bay, Lake George, N. Y., Aug. 31 to Sept. 3, one could best say that this gathering represented a sincere effort on the part of the leading industries of the country to provide steady employment, adequate pay and good working conditions for their employees. With the general theme, "Promoting Constructive Relations in Industry" and with a few labor representatives and workers present among personnel and industrial relations managers, there was no talk of "labor troubles" nor any bitterness expressed against labor unions nor the growth of organized labor. Rather the idea that management must hereafter deal with organized labor was simply accepted as a fact. In this regard, one personnel director who had to deal in his plant with two old-time AFL unions and a third and newer independent group, expressed the conviction that he had much less difficulty with the former groups, because of their more mature and experienced leadership.

The conference committee was headed by C. R. Dooley, of the Socony-Vacuum Oil Co., Inc. L. C. Morrow, editor of *Factory Management and Maintenance*, was vice-chairman. Hudson B. Hastings, professor of industrial relations, Yale University, acted as discussion leader at all the sessions and summed up the meat of the conference at its close. Over 500 delegates and their wives attended, and the companies they represented were the cream of the crop of American industry.

Real Bargaining Yet to Begin

Discussing the principles of workable and peaceable relations in industry at the opening session, George W. Taylor, impartial arbitrator of the full fashioned hosiery industry in the Philadelphia area, indicated that since the advent of the National Labor Relations Act, the initial effort of organized labor and the labor board itself has been largely to organize for collective bargaining; real bargaining has yet to begin. In these organization drives, some of them vicious in character as to the tactics of both sides, the unions have sought monopolistic control of labor in certain areas or industries, and to carry forward the battle they have put their fighting generals up front. Mr. Taylor believes that workable agreements cannot be reached while the drive is still on, and will have to wait until the diplomats of the "Department of State" of the unions sit in with management to discuss their mutual problems in a rational atmosphere.

In an effort to head off unionization, many companies, Mr. Taylor stated, raised wages to an uneconomic high level, disorganizing rate structures completely, and have not dared to lower them in the current recession. In

Problems Expressed at Silver Bay

passing, he commented that only in the thoroughly organized industries, such as hosiery, where the unions have the rank and file under full control and discipline, have wages been reduced materially (17 per cent) in the past year. Answering a question from the floor, the speaker stated that from the point of view of internal administration, he preferred a closed shop. Having acted for many years as an impartial arbitrator between organized labor and organized management, Mr. Taylor praised the type of labor leadership in the garment industries, which have been well organized for many years.

The Wagner Act, according to its preamble, sets out to encourage collective bargaining, and the theory of the law is that there will be genuine assent to conditions of employment through such bargaining. Today, however, Mr. Taylor contended that submission to a given set of working conditions did not always represent free consent to the bargaining terms. In highly competitive industries, wages cannot be set on an intra-plant basis and must be set on an inter-industry basis, if cut-throat wage cutting is to be avoided, following price-cutting on goods sold. He cited many examples from the hosiery industry to prove his point.

Management the Agent of Capital, Labor, Consumer

Management is not synonymous with capital and should be considered rather as the agent for capital, labor and the consumer, said William L. Batt, president of SKF Industries, Inc., who spoke on the topic of fusing the interests of these diverse groups. The aim of both capital and labor is the same: both seek the largest return and maximum security, leading in general to high prices and monopolistic control. There is a place for beneficent monopoly, the speaker stated, since free and unrestrictive competition is not universally workable today. Undue strength on the part of either labor or capital is detrimental, when it comes to price cutting, as it may result in the lowering of the standards of living of an entire community.

Public Trustee Favored

While Mr. Batt foresaw further Government intrusion in business, he advocated the British idea of the public trustee set over an industry rather than the use of rigid laws, which naturally invite challenge from business. Government will continue to move in on business, regardless of election results, but it should be fair and unbiased and as realistic as possible. Particularly should the Government take an unbiased attitude in labor disputes. Mr. Batt sadly admitted that both labor and the consumer have no confidence in the leadership of business executives and therefore look to Government for economic leadership. To re-establish this confidence is one of industry's immediate problems.

Questioned as to the success of labor relations in Sweden, Mr. Batt opined that the real basis of mutual relationships was confidences in government, expressed in the form of labor courts that enforce and interpret labor contracts. Both labor and industry are organized on a national basis, but most disputes are settled on an intraplant basis, with no outsiders participating. Strikes are allowed, but the plant cannot operate during this phase of the dispute.

Forming Labor Policies

The formulation, publication and practicing of a sound labor policy are real assets to a company in dealing with its men, contended Collin R. Winston, director of personnel, American Type Founders, Inc., of Elizabeth, N. J. Such a policy should recognize the fundamental desires of workers, which the speaker listed as: job security, adequate pay, reasonable working hours, good working conditions, and prompt and fair adjustment of grievances. The statement of policy need not be too detailed on all points. It may state, for example, that wages equal to or better than those found in competitive lines will be paid. The method of wage payment, such as an incentive plan, should be covered, time of shift operations, policy as to transfers and promotion, the all-important question of how layoffs and re-employment will be handled, vacation plans and the procedure for conducting joint relations and handling grievances.

American Type Founders gives a layoff notice of a week in the case of hourly workers, and also grants vacations with pay to qualified workers. Demonstrated ability comes ahead of seniority when layoff is concerned.

In the preparation of the published policy, all foremen were consulted in advance so as to obtain their cooperation in carrying out the policy, and the history of relationships with two AFL unions long in the plant was obviously consulted. A check was also made with the policies of other companies in the same general field.

In the discussion that followed, the chief point of disagreement was whether the policy should be actually printed and distributed to the men. The best argument that it shouldn't was that conditions are in a state of rapid change and new working agreements are often forced on management by the pressure of organized labor. On a tangent, the discussion led to the deadening effects of straight seniority, so widely fought for by organized labor. The solution appears to be in the use of ratings forms at half-year intervals. By allowing each man to see his rating and discuss it with his immediate superior (who is also one of his raters), a chance is given to strengthen the working force as to individual efficiency and to weed out the unfit.

Problems of Work Relief

A vivid picture of work relief problems was given by Glenn E. Jackson, executive director, Bureau of Public Assistance, New York State Department of Public Welfare. Believing that the problem of unemployment cannot be liquidated by over-simple solutions, the speaker challenged the ready answers of the "trouble isers" group. "The trouble is," they say, "reliefers won't work." Actually, it is a question of local administrators lacking sufficient imagination to think up enough relief jobs that will not compete with industry. But whether PWA'ers lean on their shovels or not does not solve the problem of re-employment in industry, Mr. Jackson maintained. Another "troubleism" is that the politicians are to blame, but politicians merely reflect in their actions the average public opinion of what is needed. Some also believe that relief is too attractive, but Mr. Jackson saw little comfort in an average monthly relief wage of $20.60 for an average family composed of 4 3/7 persons.

A program for Government in time of unemployment suggested by Mr. Jackson, included the following: undertaking an objective study of the whole problem of unemployment; the development of a sound program of public assistance to the unemployed, with both cities and states taking a more active part; the encouragement of self-help on the part of the unemployed; and lastly either the extension of planned economy throughout our entire economic system, or abandonment of the present piecemeal policy. In its own sphere, Government should lead and demonstrate social and ethical processes, including the adoption of a sound merit personnel system, and by the latter the speaker stressed the point that he did not mean civil service as it is at present constituted.

Unemployment Compensation

An idea of some of the tremendous detail handled by a state agency dealing with unemployment compensation was given by William W. Bardsley, regional unemployment compensation representative of the Social Security

Board. All 48 states now have unemployment compensation laws, but only 26 of them had progressed far enough to make tax collections and pay compensation this year. For the first seven months of 1938, $1,136,000,000 has been collected and $217,000,000 paid out in benefits to unemployed workers who could qualify under the laws. On the one hand, employer delinquency has been serious in many states, and on the other, a lot of eligibles for reason unknown did not follow through in collecting their weekly allotment. These payments averaged $10.90 a week for the nation, with payments in Tennessee low at $7.44 and high in Utah at $12.65. These low amounts raise the question of their social adequacy.

Mr. Bardsley indicated that the present set-up is unduly complicated and a study is being made at the present time to reduce the cost of administration (now averaging about 10 per cent), to lessen the volume of reporting requirements on the part of industry and to make the payment formulas more readily understandable to the worker.

Further criticism along these lines was given by Frank B. Cliffe, assistant comptroller, General Electric Co., who pointed out the tons of unnecessary reports his company is obliged to make, the undue complexity of state laws and the delays and errors in benefit payments. He suggested that for qualified companies reports be made out only for those employees actually laid off during the period, instead of presenting wage data on *all* employees, many of whom had been steadily employed for years. Another suggestion was that a merit rating (and tax reduction) be given employers who maintain steady work schedules. Such a scheme, Mr. Cliffe believes, will accelerate the wider use of annual wage payment plans.

Advocates Use of Christian Precepts

If industry is to progress, we must have more than obedience, more than support, more than zeal on the part of industry's personnel; we must also have devotion. We must have creative assistance, and constructive imagination flares brightest from a sense of devotion. Such was the view expressed by Prof. Edwin R. Schell, department of business and engineering administration, Massachusetts Institute of Technology. How to obtain this ideal? Professor Schell's answer is to give the workers foremen to whom they may be loyal and devoted, and give the foremen time and opportunity to be human in their relationships. The ideal was expressed in another way by an industrial executive whom Professor Schell quoted to the effect that: "When the dust (of the present unrest) has settled and the new order, if there be one, is with us, we will have the personal friendship of our men in no less a degree than in the past."

In dealing with the vital issues confronting management today in its rela-

tionships with its men, the speaker laid down as the active principles of conduct the well established Christian precepts of the exercise of patience and discernment; of resolute friendship; of self-sacrifice; of cooperative forebearance; of brotherly concern, and of deep spiritual understanding. The use of these principles become an operating necessity. There is no alternative, but to act upon them, according to Professor Schell.

A.I.S.C. 16th Convention Oct. 11-14 at French Lick

THE sixteenth annual convention of the American Institute of Steel Construction will be held Oct. 11, 12, 13 and 14 at French Lick Springs Hotel, French Lick, Ind. Invitations have been mailed to some 1700 executives of the structural steel frabricating shops of the United States and Canada, and advance interest indicates that the attendance will be larger than normal.

A feature will be an appraisal of possibilities of steel construction to be participated in by leading experts on this subject. The speakers will include Dr. Willard Thorp, of Dun & Bradstreet; Lowell J. Chawner, chief, Division of Economic Research, United States Department of Commerce; Dr. Miller McClintock, director, Yale University Bureau for Street Traffic Research; Victor J. Brown, publishing director, Gillette Publishing Co. Dr. Gus W. Dyer, professor of economics, Vanderbilt University, will address the banquet which is to be held on Thursday night, Oct. 13.

Thomas S. Gassner Co. Buys H. D. Dougherty Co.

PHILADELPHIA.—Thomas S. Gassner Co., Inc., which has been in the steel fabricating business for the past 86 years, has purchased the assets of H. D. Dougherty & Co., Philadelphia, manufacturer of steel hospital furniture, operating room equipment, and allied items. This amalgamation gives both companies a wide field in both lines. Considerable new equipment has been purchased to facilitate the manufacture of their products.

The Dougherty company, under that name, will be operated as a division of the Thomas S. Gassner Co. Maxwell R. Loechel is the president and treasurer; George B. Darby, Jr., vice-president and manager; and George H. Kessler is secretary.

Offices of both companies are at Wayne Avenue and Apsley Street, Philadelphia.

Acetylene Congress To Be Held in Munich

THE 13th International Congress of Carbide, Acetylene, Oxy-Acetylene Welding and Allied Industries will be held in Munich, Germany, June 25-July 1, 1939. Lectures and reports by well-known authorities are planned, and an international technical exposition will be held simultaneously with the Congress. It is anticipated that both lectures and technical exposition will be in the German Museum at Munich. Official inquiries should be directed to the office of the Congress in Berlin-Friedenau, Bennigsenstraffe 25, Berlin, Germany.

Hook Says Labor Report Can Be of "Inestimable Value"

"THE commission (European Labor Study Commission) went to England and Sweden to secure facts—not to make recommendations for the solution of our labor problems here in the United States as many people believe," Charles R. Hook, president of the American Rolling Mill Co. and a member of the Commission, said this week.

"In the limited time at our disposal, we surveyed conditions in England and Sweden, and collected a great amount of valuable data.

"If the report, and the supporting data are carefully studied by those who are considering legislation dealing with employer-employee relationships and with allowable employer-employee cooperation to fairly sustain, adjust, or improve wages and working conditions, the English and Swedish report can be of inestimable value," he said.

Mr. Hook said that he hoped the public would follow the advice and counsel of President Roosevelt who urged Americans to read the whole report saying that "unless this is done, discussions of the facts contained therein will be of little value."

"I am very happy to say that there was unanimous opinion on the part of all the members of the commission with respect to the facts included in the report," Mr. Hook said.

Republic Takes No Action On Preferred Dividends

AT a meeting of Republic Steel Corp. board of directors in Cleveland, Sept. 2, no action was taken regarding payment of dividends on Oct. 1, 1938, on 6 per cent cumulative convertible prior preference stock, series A, or on 6 per cent cumulative convertible preferred stock.

Government Steel Buying For Week Totals $363,786

WASHINGTON.—The Walsh-Healey Government Contracts Board reports contracts for iron and steel products as listed by various Government departments during the week ended Sept. 1, totaled $363,786.99. This compared with $145,688.48 the previous week and $282,800 two weeks ago.

Bethlehem Steel Co., Alameda, Cal., received two contracts; one for $102,400, the other for $29,625, for supplying the Puget Sound Navy Yard with structural steel. Carnegie-Illinois Steel Corp., New York, under the next highest contract, will furnish WPA with steel grid floor slabs to cost an estimated $45,811.25. Allegheny Steel Co., Brackenridge, Pa., received a $25,841.03 contract for sheets and strips for the Navy.

For the same period, Government contracts covering non-ferrous metals and alloys totaled $226,888.17; for transportation equipment, $89,253.53; for electrical apparatus and supp'ies, $112,013.77; and for "other machinery," $268,017.

This Week on the Assembly Line

(CONTINUED FROM PAGE 58)

ing wheel, is being developed and may be used.

G. M. Discusses "Surplus"

The constant striving to educate the public and employee to better understanding of business activity strikes a new note in a pamphlet distributed by General Motors recently. Entitled, "A Summary of General Motors Business for the First Six Months of 1938," it illustrates graphically the decrease in sales to about 55 per cent of the 1937 total, the decrease in employment to 77 per cent and a reduction in weekly wages for the second quarter to 75 per cent of the figure for a year ago. Finally it shows that company earnings were only 30 per cent of last year's total for the first half.

"What is Surplus?" was the text of the pamphlet. Pointing to the General Motors financial statement of June 30, 1938, which reported earned surplus of $401,765,828, General Motors stated:

"Sometimes people seem to think that 'surplus' means excess money in the bank, or excess something else that is not needed. Surplus for a company means about the same as savings for a family. ***** The 401 million dollar surplus item in the General Motors financial report is savings the owners of the company have put back in the business to furnish additional buildings, land, tools and working funds. Thus surplus has made jobs for both General Motors employees and workers in other industries, and does not mean cash accumulated in excess of the needs of the business. ***** Two out of every five jobs in General Motors were made possible by surplus."

Noises of Homestead Plant Are Recorded for Pageant

AUTHENTIC sounds of steel-making operations have been recorded by radio engineers for use in a pageant of the history of the "Workshop of the World" to be presented from Sept. 16 to 20 during the Sesqui-Centennial of Allegheny County, Pa. Carnegie-Illinois Steel Corp.'s Homestead plant was the "laboratory" where sound technicians of Pittsburgh's radio station KDKA recorded the sounds of the charging of an open hearth furnace, the rolls of a slabbing mill and the hum of pump and power houses.

Railroad Buying Gains in August

ORDERS for new rolling stock placed with domestic railroad equipment builders in August totaled 303 freight cars and 18 locomotives, as compared with 50 freight cars and three locomotives in July, according to *Railway Age*. No export orders were placed during the month and no new business was booked by Canadian builders, the publication further reports. The cumulative totals of rolling stock purchases for the year through August are 96 locomotives and 8327 freight cars.

Australia Has Empire's Second Largest Steel Industry

LONDON (By Mail).—The importance to Australia of the great iron and steel industry operated by the Broken Hill Proprietary at Newcastle, New South Wales, was emphasized by K. Butler, assistant manager of the company, in a recent lecture at Newcastle. Mr. Butler declared that the plant and its subsidiaries at Newcastle now constitute the second largest steel industry in the British Empire.

"Strangely enough," he continued, "the Empire's largest iron and steel industry is not in Britain, but in India. Production at Newcastle is, however, increasing annually, and it is hoped that the production at the Indian steelworks will be eclipsed next year.

"It is essential for the Newcastle industry to have an adequate supply of raw materials. Iron ore is obtained from Whyalla, about 1200 miles distant. A ship is loaded every day at Whyalla for Newcastle and Port Kembla. Limestone is brought from Tasmania. Most of the coal comes from collieries in the neighborhood, more than 1,900,000 tons being used annually by the steel mills. This is 20 per cent of Australia's total coal production.

"Approximately 2800 tons of steel daily are produced by the Newcastle mills. Australia consumes it all and is asking for more. As a result the company is faced with the difficulty of all orders in contract time.

"The Broken Hill Proprietary uses 30,000,000 cubic feet of gas daily, or sufficient to supply the city of Sydney and every town along the Sydney line to Singleton. Every 30 hours it produces enough 5-gage wire to span the continent from Newcastle to Perth. Every year 63,800 government trucks and 500,000 hoppers are exchanged with the railroad department. The company's 30 locomotives shunt 9,000,000 tons of commodities per annum. In addition, Lysaght's works produce 250,000 sheets of galvanized iron in a week, while in the same period Stewarts & Lloyds make enough of a certain type of tubes to make a pipeline from Newcastle to Sydney.

"The Broken Hill Proprietary and its subsidiary industries now employ 24,000 people and pay £6,250,000 a year ($31,250,000) in wages. Money is being continually poured into the industry and extensions to the works are constantly being made. The company has erected its own power station, and next year it will replace the steam motors in the rolling mills with giant electric motors. The Newcastle industry is now more than able to compete with the steel industries of other centers of the world," Mr. Butler said.

Contracts Board Agrees On Steel Wage Rates

WASHINGTON.—O. R. Strackbein, a member of the Walsh-Healey Public Contracts Board, told THE IRON AGE at mid-week that the Board "in a general way" had agreed on minimum wages for the steel industry. A like statement had been previously made by Chairman Holland of the Board. The findings will be submitted to Labor Secretary Frances Perkins.

(*For further details see page* 63)

U. S. Allocates $2,000,000 for Munition Educational Orders

WASHINGTON.—Presidential approval of the War Department's plan of procedure under the educational orders program and a $2,000,000 allocation for the placing of orders during the current fiscal year was announced early this week by Assistant Secretary of War Louis Johnson.

The approved plans, submitted by a seven-man board headed by Brig. Gen. Henry H. Arnold, call for invitations to be sent soon to selected manufacturing companies which, in the judgment of the Secretary of War, are considered competent to manufacture particular munitions in time of war. Bids for equipping concerns to make the following items are to be requested during the first year of the program: U. S. caliber, .30 M. (semi-automatic) rifles; 3 in. A.A. gun, recoil mechanism; forging, 75 mm. shell; machining, 75 mm. shell; gas mask; 60 in. searchlight. Other items may be included in the first year's program if recommended by the board and approved by the President.

The department expects each year to designate a board of officers whose job will be to select from the complete program, which contemplates $10,000,000 of expenditures at the rate of $2,000,000 for the next five years, items considered as occupying positions of highest priority. The schedule for the year will then be planned accordingly.

Designed to familiarize selected manufacturers with the more difficult problems of munitions manufacture, the $10,000,000 program was given Congressional approval last session. The War Department had attempted ever since the World War to obtain such legislation. The program will give the War Department dies, jigs, fixtures and other manufacturing aids, enabling the country to speed up its military preparations in the event of an emergency.

Upon completion of an educational order, the equipment will become the property of the Government and stored until the necessity for use arises. In selecting items for inclusion under the program only those considered essential and showing promise of remaining standard over a period of time will be chosen.

U. S. Asks Bids on "Up to Twelve" Cargo Ships

WASHINGTON.—The Maritime Commission has advertised for bids, returnable Oct. 18, for an undecided number of C-3 steel cargo ships. The commission estimates that each ship will require about 4140 tons of steel.

Bids will be considered for one to six vessels from the same contractor but no single yard will receive a construction award for more than six. Last June, the commission's plans called for the construction of six ships of the C-3 design during 1938 but it was announced last Tuesday that as many as 12 may be constructed "if prices are in line with the commission's estimates of costs."

Engineering Sales Co., 218 Builders' Building, Charlotte, N. C., has been appointed representative of the Cleveland Tramrail Division of the Cleveland Crane & Engineering Co. to handle sales and erection of Cleveland Tramrail overhead materials handling equipment in North Carolina and South Carolina. In this capacity it will operate as the Cleveland Tramrail Carolinas Co., Division of Engineering Sales Co.

REINFORCING STEEL

. . . Awards of 9520 tons; 6940 tons in new projects.

NORTH ATLANTIC STATES

AWARDS

950 Tons, Brooklyn, Meeker Avenue bridge, Queens approach, to Jones & Laughlin Steel Corp., Long Island City, N. Y., through Elmhurst Contracting Co., New York, general contracting.

750 Tons, Newington, Conn., State sanatorium laundry, to Concrete Steel Co., Boston.

615 Tons, Lock Haven, Pa., bridge, to Truscon Steel Co., Youngstown, through C. W. Good, Lancaster, Pa., contractor.

560 Tons, Boston, Boston University business administration building, to Bethlehem Steel Co., Bethlehem, Pa.

425 Tons, Rockaway Beach, N. Y., grade crossing elimination, to Bethlehem Steel Co., Bethlehem, Pa., through Boro Asphalt Corp., Brooklyn, contractor.

340 Tons, Queens, N. Y., contract 6, beach channel drive, to Bethlehem Steel Co., Bethlehem, Pa., through Sprague Construction Co., general contractor.

310 Tons, Westmoreland County, Pa., bridges, to Jones & Laughlin Steel Corp., through Electric Welding Co., Pittsburgh; G. A. & F. M. Wagman, Dallastown, Pa., contractor.

250 Tons, New York, elevated public highway and approaches, West and Marginal Streets, from Canal Street to Leroy Street, to Joseph T. Ryerson & Son, Inc., Newark; P. T. Cox Construction Co., contractor.

250 Tons, Chester, Pa., building No. 15 and extension to finishing building, Scott Paper Co., to Bethlehem Steel Co., Bethlehem, Pa.; Wark & Co., contractor.

220 Tons, Westmoreland County, Pa., mats for highway project, to Bethlehem Steel Co., Bethlehem, Pa.

180 Tons, New York, building, Hunter College, to Igoe Bros., Newark, N. J., through A. A. Volk Co., New York, general contractor

180 Tons, Philadelphia, stock for Navy Yard, to Bethlehem Steel Co., Bethlehem, Pa.

CENTRAL AND WESTERN STATES

1208 Tons, Fort Knox, Ky., barracks, to Knoxville Iron Co., Knoxville, Ky.

600 Tons, Savanna, Ill., 70 powder magazines, to Bethlehem Steel Co., Bethlehem, Pa.

550 Tons, Cleveland, elevated Cloverleaf intersection to Patterson-Leitch Co., Cleveland, through Hunkin-Conkey Construction Co., Cleveland.

366 Tons, Murfreesboro, Tenn., Veterans' project, to Wilson, Weesner, Wilkins & Co., Nashville.

335 Tons, Calexico, Cal., All-American Canal (Invitations B-42108-A and B-42210-A), to Columbia Steel Co., San Francisco.

269 Tons, Palo Alto, Cal., Veterans' infirmary, to Truscon Steel Co., San Francisco; James I. Barnes, Santa Monica, Cal., general contractor.

230 Tons, Odair, Wash., Columbia Basin project (Invitation A-38123-A), to Carnegie-Illinois Steel Corp., Chicago.

189 Tons, State of Illinois, procurement office, to Worden Allen Co., Milwaukee.

181 Tons, Nashville, Tenn., State office building, to Wilson, Weesner, Wilkins & Co., Nashville, through Nils E. Yearwood, Nashville.

175 Tons, Cedar Rapids, Iowa, Wilder Grain Co., building, to Inland Steel Co., Chicago, through John S. Metcalfe Co.

172 Tons, Waterloo, Iowa, Rath Packing Co. building, to Des Moines Structural Steel Co., through W. A. Klinger, Inc., Sioux City.

106 Tons, Indianapolis, Veterans' project, to West Virginia Rail Co., Huntington, W. Va., through Algernon Blair Co.

102 Tons, Oakland, Cal., Mountain Boulevard drainage structures, to W. C. Hauck & Co., San Francisco.

NEW REINFORCING BAR PROJECTS

NORTH ATLANTIC STATES

792 Tons, Queens, N. Y., elevated highway and approaches, 45th to 64th Streets.

226 Tons, Chautauqua County, N. Y., mesh, highway project R. C. 3987; bids close Sept. 27.

200 Tons, Pawtucket, R. I., junior and senior high school.

160 Tons, New York, Queensboro bridge roadway, inquiry 227808; Bethlehem Steel Co., Bethlehem, Pa., low bidder.

CENTRAL AND WESTERN STATES

1450 Tons, San Francisco, Golden Gate bridge approach tunnel; bids Sept. 21.

1300 Tons, Bremerton, Wash., graving dry dock at Navy Yard; bids Sept. 14.

400 Tons, Evansville, Ind., waterworks building.

390 Tons, Fort Brady, Mich., barracks building.

250 Tons, Columbia, Mo., State Cancer Hospital; bids Sept. 20.

235 Tons, San Francisco, Edwards Coffee Co. plant.

210 Tons, Coalinga, Cal., high school auditorium.

200 Tons, Cedar Rapids, Iowa, bridge.

160 Tons, Glencoe, Ill., school building.

114 Tons, Graham County, Ariz., highway work; bids Sept. 16.

HAWAII

850 Tons, Port Allen, T. H., wharf and terminal improvements.

....PIPE LINES....

Peoples Gas & Fuel Co., Inc., Minden, La., plans steel pipe line extensions in natural gas distribution system in parts of Webster Parish. Cost close to $40,000.

Eunice, La., plans pipe line extensions and replacements in natural gas distributing system. Cost about $110,000, of which $65,000 will be a bond issue and remainder a Federal grant. Special election has been called Sept. 27 to approve bonds in amount noted.

Supervising Construction Engineer, Indian Service, Billings, Mont., asks bids until Sept. 12 for 1780 lin. ft. of mild steel pipe and 2020 lin. ft. of wrought iron pipe for Pipestone, Minn.

Henderson, Ky., closes bids Sept. 19 for pipe line extensions and replacements in natural gas distribution system, requiring about 188,000 lin. ft. of 2, 4 and 6-in. pipe, three regulator stations and other operating facilities. Cast iron pressure pipe of sizes noted is proposed. Cost $201,818, of which $90,818 has been secured through Federal grant. Wescott & Thornton, Gary Building, Owensboro, Ky., are consulting engineers.

Northern Indiana Public Service Co., Hammond, Ind., has secured permission to substitute natural gas for artificial gas at Columbia City, Roanoke and South Whitley, Ind., and will make extensions and changes in pipe lines and facilities in these municipalities for this purpose.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., Col T. A. Leisen, secretary, plans pipe lines for gas distribution in district No. 855, recently created; also pipe lines for similar purpose in parts of Wirt, Spencer and Monroe Streets.

Hillsboro, Kan., plans pipe lines for municipal gas distribution. Cost about $49,000, of which $22,050 has been secured through Federal aid. Hefling & Hunter, East Second Street, Hutchinson, Kan., are consulting engineers.

Robstown, Tex., plans pipe lines for municipal gas distribution system, including operating facilities. It is proposed to use part of fund of $275,000 being secured through Federal aid for municipal electric power plant for gas utility. Garrett Engineering Co., 308 Hughes Street, Houston, Tex., is consulting engineer.

United Gas Pipe Line Co., Rusk Building, Houston, Tex., has let contract to Brown & Root, 4300 Calhoun Road, for welded steel pipe line from gas field near Jennings, La., to connection with main 10-in. pipe line, about seven miles, for natural gas transmission. About 37,200 lin. ft. of pipe will be required.

San Diego, Cal., has received low bid from Charles and F. W. Steffgen, local, for a 9000-ft. 16-in. water main across San Diego Bay.

Tucumari, N. M., has taken bids on a 12-mile pipe line.

Napa, Cal., asks bids Sept. 12 on a pipe line requiring 4530 ft. of 24-in. pipe.

Jugoslav Steel Corp. to Be Controlled by Government

THE JUGOSLAV STEEL CORP., which has been founded by the Jugoslav Government to acquire prospecting and operating rights over iron deposits, to manufacture iron and steel and finished products and to market these and other metallurgical products, will be throughout under State control, with headquarters at Sarajevo, and have a capital of 600,000,000 dinar, made up of 120,000 shares of 500 dinar each.

The State colleries at Zenica and the State iron mine at Ljbija are being transferred to the corporation, as well as the Vares ironworks. These concerns have been controlled by the Ministry of Mines and Forestry and are valued at 385,000,000 dinar, for which 77,000 shares will be vested in the Minister. The corporation is also to be merged with the Zenica Iron & Steel Works Co.

Pressed Steel Bicycle Frame Made in England

WASHINGTON.—A bicycle frame of pressed steel in lieu of the standard tubular construction is being manufactured in England for overseas markets, the Commerce Department reports.

The frame, consisting of five separate channel section parts secured by nickel steel bolts and a weatherproof bracket assembly, is quickly demountable and easily reassembled. Manufacturers also claim that the new design is as strong as the orthodox tubular models. It has the same specifications. The report said that export prices are virtually the same as for similar tubular machines. Unassembled pressed steel models when packed for shipment are said to require only half the space needed by their conventional counterparts.

Inland Cuts Minimum On Rails to 200 Tons

CHICAGO.—Inland Steel Co. has reduced the minimum purchase of rails for which the base price is applicable from 500 to 200 gross tons. In recent years, the company said, many railroads have ordered rails in small quantities, frequently necessitating payment of extras. The 200 ton minimum, effective Sept. 1, is, Inland officials said, "in line with present day conditions" and should be of direct benefit to the railroads.

..CAST IRON PIPE..

Ashland, Me., has tentative plans for a water and sewer system, and has asked for a $90,000 WPA loan. W. H. Owen, Castine, and R. W. Palmer, Ashland, Me., are engineers.

Newburyport, Mass., has been granted a WPA loan for a standpipe, mains and pumping station. Whitman & Howard, 89 Broad Street, Boston, are engineers.

South Bellingham, Mass., has tentative plans for water mains, pumping station, standpipe, hydrants, wells, etc., to cost $429,000. Hayden, Harding & Buchanan, 75 State Street, Boston, are engineers.

Hamilton, Mass., has approved plans for a water system. Whitman & Howard, 89 Broad Street, Boston, are engineers.

Colechester, Mass., has taken under advisement bids on about 350 tons, 24,000 ft., of 3 to 10-in. pipe.

Pawtucket, R. I., will close contractors' bids Sept. 8 on about 1000 tons of 6 to 20 in. pipe.

Amherst, Mass., closes bids Sept. 9 on 200 tons of cast iron pipe for a sewer project.

Lanesborough, Mass., has awarded 2800 ft. of 6-in. and 17,000 ft. of 8-in. pipe to United States Pipe & Foundry Co.

Lakemore, Ohio, has awarded 325 tons of cast iron pipe for a water distribution system, to J. B. Clow & Sons Co., Cleveland.

Smithville, Ohio, will open bids Sept. 10 on approximately 250 tons of pipe for a water distribution system.

Grand Rapids, Mich., plans pipe line for main water supply from Lake Michigan to city limits. Cost about $2,225,000 with pumping and control stations and other operating facilities. Bond issue in that amount has been sold.

Soldier Township Water District, near Topeka, Kan., care of O. H. Eidman, New England Building, Topeka, consulting engineer, plans pipe lines for water system in Rochester district, with main line for supply from Topeka. Cost about $140,000. Financing is being arranged through Federal aid.

Mathis, Tex., plans pipe lines for water system and other waterworks installation. Fund of $135,000 is being arranged through Federal aid for this and sewerage system. H. R. F. Helland, Frost National Bank Building, San Antonio, Tex., is consulting engineer.

Houston, Tex., has authorized bond issue of $550,000 and will secure Federal grant of $450,000, making total fund of $1,000,000 for extensions and replacements in pipe lines for water system, requiring 8-in. and smaller. City will be divided into 11 sections and awards made individually for each section, all contracts to be placed prior to Jan. 1, 1939. Practically entire appropriation will be used for purpose noted. C. L. Fugate is water engineer in charge.

Pardeeville, Wis., has applied for WPA funds for $50,000 waterworks system. General Engineering Co., Portage, Wis., is in charge.

Pittsville, Wis., has applied for PWA grant of $23,727 toward construction of waterworks system estimated to cost $52,727. A. Lawrie Kurtz, 739 North Broadway, Milwaukee, is consulting engineer.

Poynette, Wis., has applied for PWA grant for construction of $40,000 waterworks system. J. L. Kebaugh is village clerk.

Whitehall, Wis., plans $25,000 waterworks plant as PWA project. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is consulting engineer.

Bonduel, Wis., has filed application for PWA funds to build waterworks and sewerage systems to cost about $78,000. Helmuth Wussow is village clerk.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 16 for 2400 lin. ft. of 4-in. cast iron soil pipe and cast iron soil pipe fittings; also for 2600 lin. ft. of cast iron water pipe with fittings (Schedule 3379).

George B. McDougall, State architect, Public Works Building, Sacramento, Cal., asks bids until Sept. 13 for pipe for water system at State institution at Spadra, Cal., known as Pacific Colony, including 24,560 lin. ft. of 12-in. from connection with system of Pomona Irrigation Co., Pomona, to concrete storage reservoir at Colony, and about 1500 lin. ft. of 6-in. from that point, with headworks and operating equipment.

Laurel, Mont., plans main pipe line for water supply and pumping station. Bond issue of $40,000 has been authorized. T. A. Rigney is city engineer.

Wichita, Kan., plans pipe lines for water system extensions and replacements, including main trunk lines. Fund of $2,425,000 is being arranged for this and other waterworks installation, including deep-well pumping equipment and accessories. Special election will be held soon to vote bonds. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

South Elgin, Ill., asks bids until Sept. 12 for pipe lines for water system and other waterworks installation. Cost about $70,900. Financing has been arranged through Federal aid. L. B. Kinsey, 512 Court Street, Pekin, Ill., is consulting engineer.

Tacoma, Wash., has awarded 1710 tons of 4 to 20-in. cast iron pipe and fittings, and 8560 ft. of 12-in. pipe to United States Pipe & Foundry Co., San Francisco.

Price, Utah, has awarded 3000 ft. of 12-in. pipe to Pacific States Cast Iron Pipe Co., Provo, Utah.

Sigurd, Utah, has awarded approximately 325 tons of pipe for water system to Pacific States Cast Iron Pipe Co., Provo, Utah.

Spokane, Wash., has awarded 397 tons of 6, 8 and 12-in. pipe to Pacific States Cast Iron Pipe Co., Provo, Utah.

Timken Roller Bearing Co., Canton, Ohio, has opened an office at 519 Transportation Building, Washington, to provide Government departments with technical service. A. L. Campbell is in charge.

August Iron Output Up Sharply

PRODUCTION of coke pig iron in August on a daily basis went up 23.8 per cent over that in July, or from 38,767 tons to 48,193 tons a day. Output for the month totaled 1,493,995 gross tons, compared with 1,201,785 tons in July.

The number of furnaces in blast on Sept. 1 also showed a sharp increase. On that date there were 89 furnaces in blast, operating at the rate of 50,235 tons daily, compared with 77 furnaces on Aug. 1, producing at the rate of 41,400 tons daily. Sixteen furnaces were put in operation during the month and four were blown out or banked. The Steel Corporation blew in six furnaces, independent producers blew in nine furnaces and took two off blast, and merchant producers blew one in and blew out or banked two units. One furnace was changed over from ferromanganese to pig iron production.

Among the furnaces blown in were the following: One Carrie, one Ohio, Carnegie-Illinois Steel Corp.; one Lorain, National Tube Co.; three Ensley, Tennessee Coal, Iron & Railroad Co.; one Donner, one Gulfsteel Division and one Pioneer, Republic Steel Corp.; one Cambria, Bethlehem Steel Co., and another Cambria changed over from ferromanganese to pig iron; Riverside and Portsmouth, Wheeling Steel Corp.; one Weirton and the newly-completed Zug Island, National Steel Corp.; one Madeline, Inland Steel Co., and the furnace of the Jackson Iron & Steel Co.

Furnaces blown out or banked included: One Susquehanna furnace, National Steel Corp.; one Standish, Chateaugay Ore & Iron Co.; one Cambria changed over from ferromanganese to pig iron, Bethlehem Steel Co.; one Anna, Struthers Iron & Steel Co., and one Colorado unit of the Colorado Fuel & Iron Co.

The number of available furnaces making pig iron has been increased from 238 to 239 by the completion and blowing in of the new Zug Island unit of the National Steel Corp.

Daily Average Production of Coke Pig Iron

Gross Tons

	1938	1937	1936	1935	1934
January	46,100	103,597	65,351	47,656	39,201
February	46,367	107,115	62,886	57,448	45,131
March	46,854	111,596	65,816	57,098	52,243
April	45,871	113,055	80,125	55,449	57,561
May	40,485	114,104	85,432	55,713	65,900
June	35,400	103,584	86,208	51,570	64,338
½ year	43,497	108,876	74,331	54,138	54,134
July	38,767	112,866	83,686	49,041	39,510
August	48,193	116,317	87,475	56,816	34,012
September	....	113,679	91,010	59,216	29,935
October	....	93,311	96,512	63,820	30,679
November	....	66,891	98,246	68,864	31,898
December	....	48,075	100,485	67,950	33,149
Year	....	100,305	83,658	67,556	43,592

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1938	1937	1938	1937
January	1,429,085	3,211,500	22,388	23,060
February	1,298,268	2,999,218	20,205	24,228
March	1,452,487	3,459,473	21,194	27,757
April	1,376,141	3,391,665	18,607	26,765
May	1,255,024	3,537,231	13,341	34,632
June	1,062,021	3,107,506	14,546	34,415
½ year	7,873,026	19,706,593	110,281	170,857
July	1,201,785	3,498,858	20,818	23,913
August	1,493,995	3,605,818	6,088	29,596
September	.....	3,410,371	....	26,100
October	.....	2,892,629	....	26,348
November	.....	2,006,724	....	25,473
December	.....	1,490,324	....	22,674
Year	.....	36,611,317	....	324,961

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1938	1937	1936	1935	1934
January	10,635	16,106	10,537	3,926	7,800
February	8,854	16,514	11,296	6,288	7,071
March	8,524	16,457	10,831	7,089	7,197
April	8,273	14,517	13,897	8,799	8,838
May	6,431	19,483	12,814	8,441	9,099
June	5,375	15,870	14,209	7,874	9,499
July	5,495	19,609	11,619	8,644	7,880
August	6,614	17,831	12,148	8,194	6,043
September	....	20,065	12,526	10,090	4,986
October	....	18,950	13,645	11,199	5,765
November	....	15,662	14,739	12,503	6,610
December	....	10,964	14,852	13,312	4,399

Production by Districts and Coke Furnaces in Blast

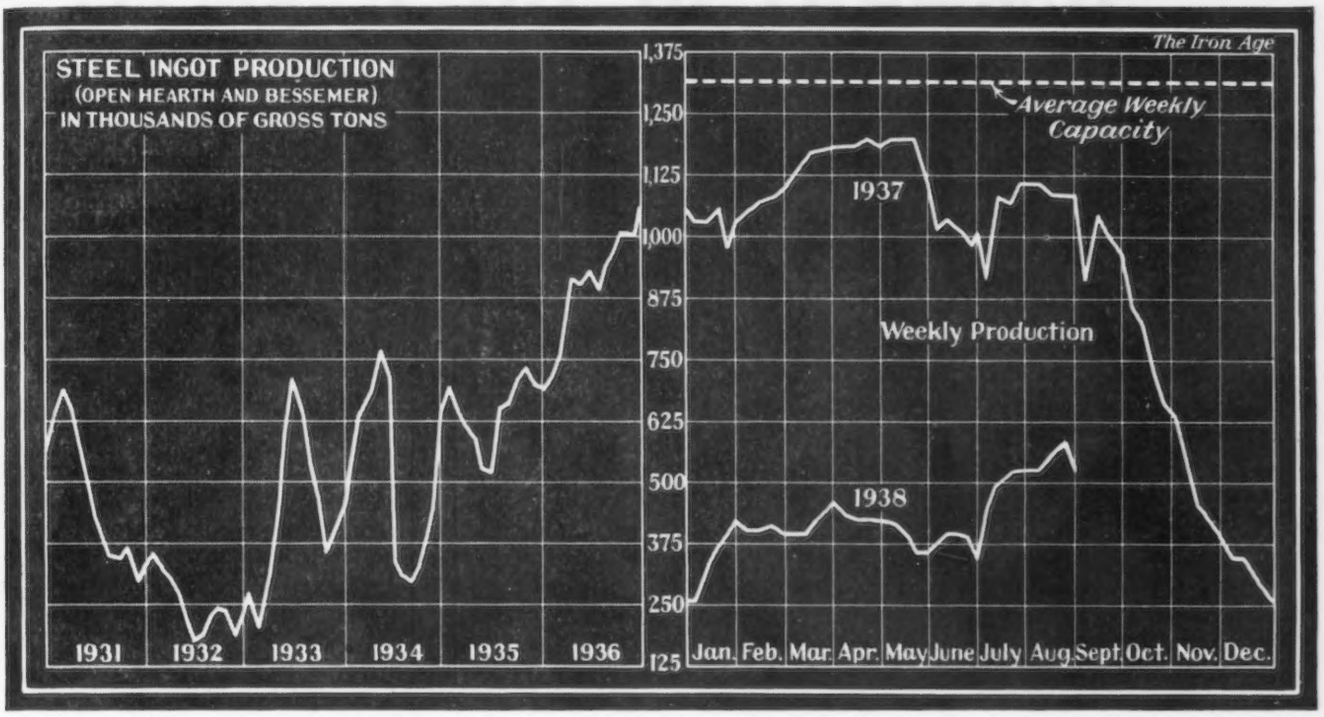
FURNACES	Production (Gross Tons) August (31 Days)	Production (Gross Tons) July (31 Days)	Sept. 1 Number in Blast	Sept. 1 Operating Rate, Tons a Day	August 1 Number in Blast	August 1 Operating Rate, Tons a Day
New York:						
Buffalo	79,134	78,800	4	2,595	4	2,540
Other New York and Mass.	14,786	21,233	1	465	2	685
Pennsylvania:						
Lehigh Valley	46,463	48,041	4	1,500	4	1,670
Schuylkill Valley	.....	.....	0	....	0	....
Susquehanna and Lebanon Valleys	14,591	14,614	1	470	1	470
Pittsburgh District	246,986	210,313	12	8,095	11	6,785
Ferro. and Spiegel	3,099	10,536	2	100	2	340
Shenango Valley	23,604	23,898	1	760	1	770
Western Pennsylvania	49,241	21,230	3	575	1	410
Ferro. and Spiegel	.....	3,705	0	....	1	120
Maryland	108,249	96,007	4	3,490	4	3,095
Wheeling District	102,503	81,095	6	4,240	4	2,615
Ohio:						
Mahoning Valley	179,210	127,217	8	5,765	8	4,310
Central and Northern	110,637	75,335	7	4,105	6	2,760
Southern	34,471	17,994	4	1,130	2	580
Illinois and Indiana	249,940	208,666	12	8,175	11	7,925
Michigan and Minnesota	50,863	41,417	4	1,955	3	1,335
Colorado, Missouri and Utah	18,317	17,464	2	590	2	565
Ferromanganese	.....	3,789	0	....	1	120
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	2,989	2,788	1	95	1	90
Kentucky	9,008	9,012	1	290	1	290
Alabama	149,904	88,631	12	5,840	7	3,925
Tennessee	.....	.....	0	....	0	....
Total	1,493,995	1,201,785	89	50,235	77	41,400

Schenectady's Seventh Welded Building Rises

THE four-story addition to the Ellis Hospital at Schenectady, N. Y., now in course of erection, will be the seventh building with an all-welded steel frame to be erected in that city. The previous ones include the local Y.M.C.A. and Y.W.C.A., the city hall, a large printing establishment, the new State Armory, and the new building for WGY, the General Electric broadcasting station.

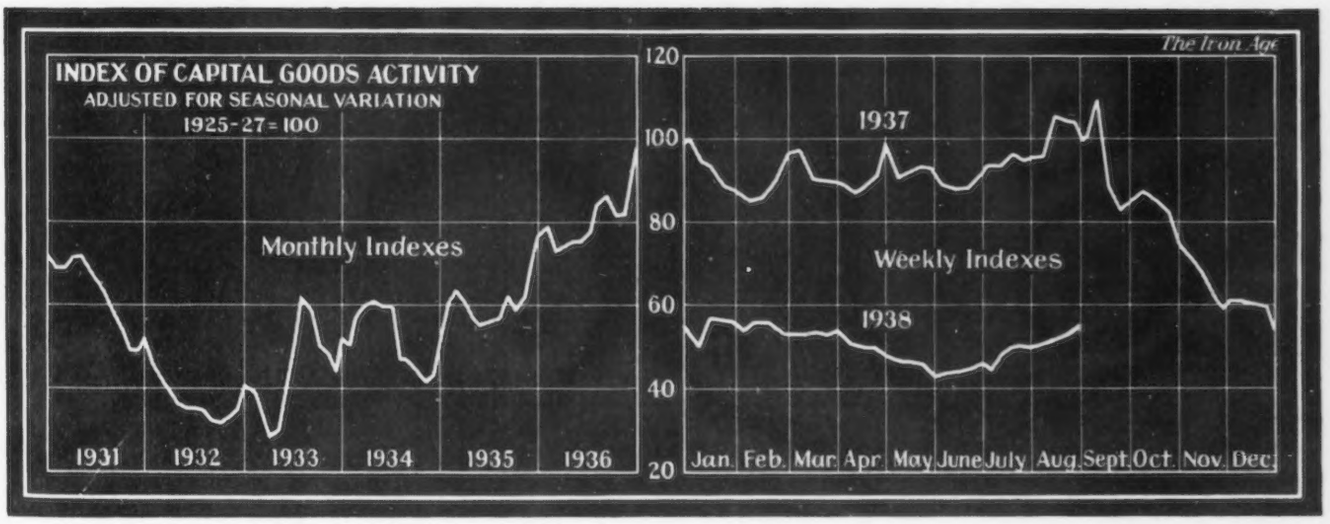
Erection crews of General Erectors, Inc., have the steel framework of the hospital addition partly in place. Following behind them, operators from Scott Welding Service, Long Island City, N. Y., are permanently joining the various members, employing G-E equipment. Construction of the new building is under the direction of James E. Lowe & Sons, Inc., Schenectady contractors.

Ingot Rate Declines to 40 per cent in Holiday Week



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Wheel-ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
	CURRENT WEEK...	27.0	37.0	38.0	24.0	43.0	54.0	42.0	49.5	36.0	44.6	34.3	40.3	43.0	**40.0**
	PREVIOUS WEEK..	33.0	40.0	44.0	27.0	47.0	70.0	46.5	51.8	40.4	54.0	40.0	45.5	50.0	**44.0**

Capital Goods Index Establishes New High for Year



INCREASES of varying proportions in every component raised THE IRON AGE index of capital goods activity to 58.4 for the week ended Sept. 3, establishing a new high for the present year. The previous high was 57.5, recorded in the week of Jan. 15. From this position, however, the index declined consistently until a low of 43 was reached in the first week of June. At this point the trend of the index was reversed and the index has since been slowly but persistently rising, experiencing but two minor setbacks in the 13 weeks since the year's low point was reached. The large gains in the steel and automobile series in the past week were due in a large measure to a contraseasonal increase in activity in these fields.

	Week Ended Sept. 3	Week Ended Aug. 27	Comparable Week 1937	Comparable Week 1929
Steel ingot production[1]	66.5	62.3	121.0	120.7
Automobile production[2]	48.4	35.6	140.2	96.6
Construction contracts[3]	68.0	67.9	66.9	106.7
Forest products carloadings[4]	55.1	53.5	68.5	125.0
Production and shipments, Pittsburgh District[5]	53.9	53.2	103.5	121.7
Combined index	**58.4**	**54.5**	**100.0**	**114.1**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record;* 4. Association of American Railroads; 5. University of Pittsburgh.

. . . .SUMMARY OF THE WEEK. . . .

. . . Pig iron output gains 23.8 per cent, ingots 28 per cent in August.

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. . . Steel buying slows up a bit over the holiday period.

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. . . Scrap off slightly at Pittsburgh; Italy and Japan buy here.

PIG iron output in August gained 23.8 per cent over that of July, while steel ingot production ran about 28 per cent ahead of the previous month's total.

The total amount of pig iron produced last month was 1,493,995 gross tons compared with 1,201,785 tons in July, the daily rate advancing to 48,193 tons from 38,767 tons in July. On Sept. 1 there were 89 furnaces in blast, a gain of 12 over those in service on Aug. 1. Included in the active furnaces is the new Zug Island unit of the National Steel Corp. near Detroit, which increases the number of available furnaces in the country from 238 to 239.

Ingot production was the largest since October, 1937, totaling 2,546,988 gross tons for August against 1,982,058 tons in July. The average operating rate last month was 42.85 per cent compared with 33.42 per cent in July.

Taking into account the Labor Day holiday, the ingot rate for the current week is estimated at 40 per cent, but the number of steel-making furnaces in operation following the holiday indicates that next week's rate may be slightly above that of last week, which was 44 per cent.

Holiday influences may have accounted for a slowing up in the placing of orders during the past week. Some companies booked less business than in the preceding week. While August business as a whole gained quite sharply over that of July, the improvement has not been progressive over the past two or three weeks, indicating, perhaps, that gains from this point on will come more slowly. However, the steel industry generally retains its hopeful belief that business will be moderately better over the next month or two.

THE extremely conservative hand-to-mouth buying now prevalent and the low state of consumers' steel inventories lead the industry to believe that any autumn improvement in sales of finished goods will be quickly reflected in steel buying. Moreover, the automobile industry will require more steel for new models within a month and the requirements for publicly-financed construction projects have yet to be rolled in many instances. Miscellaneous orders still account for a large part of the industry's present activity.

Structural steel lettings in the week totaled about 26,500 tons, of which 6725 tons is for a subway in Brooklyn, 1500 tons for a State office building in Madison, Wis., 1500 tons for a chamber of commerce building in Houston, Tex., and 1300 tons for a hangar at Lowry Field, Colo. About 3000 tons of steel piling has been awarded for piers and jetties in Chicago. New projects out for bids total about 23,000 tons, including 9000 tons for an elevated highway in Queens, N. Y., 7000 tons for an elevated highway and approaches to the Meeker Street Bridge, Brooklyn, and 1000 tons for a water softening plant at Minneapolis. Reinforcing steel awards of 9500 tons and new inquiries for about 7000 tons are further evidences of the continued activity in building projects largely stimulated by Government money.

New models will be shown to the public by the automobile companies this month or early next month. Meanwhile a steady rise in motor car assemblies is probable despite a temporary shutdown by Ford on Sept. 15.

While the steel industry is not expecting much railroad buying this fall, some purchases are assured. The New York Central has received approval of a $5,000,000 loan, with RFC guarantee, for the purchase of 28,600 tons of rails and material for the repair of 185 locomotives, 300 passenger cars and 1000 freight cars. The Illinois Central may close a contract within a week for the building of 1000 freight cars to be acquired by lease from a car builder.

STEEL companies seem to be in no hurry to make announcements of prices for fourth quarter, the usual time for such statements having passed. There is a possibility that no announcement will be made until the Government Contracts Board has made its decision on steel wage rates. The withholding of price announcements apparently has had no detrimental effect except in the case of tin plate, users of which are buying only the most necessary requirements in the expectation of a price reduction.

This period of waiting for fresh developments has resulted in a slight weakening in scrap prices, amounting to 25c. on steel scrap at Pittsburgh and 50c. at Cleveland. THE IRON AGE composite price has declined 8c. to $14.42. Renewed purchasing by Italy and Japan may give some strength to the market provided domestic buying is also renewed. Italy is reported to have taken 80,000 tons or more and Japan a smaller quantity, but the latter is expected to be a steady buyer again.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Sept. 7, 1938	Aug. 30, 1938	Aug. 9, 1938	*Sept. 8, 1937
Rails, heavy, at mill	$42.50	$42.50	$42.50	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	....
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	....

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Cents Per Lb.:	Sept. 7, 1938	Aug. 30, 1938	Aug. 9, 1938	*Sept. 8, 1937
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.35	$5.35	$5.35	$5.35

*Pittsburgh prices only.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$21.84	$21.84	$21.84	$25.76
No. 2, Valley furnace	20.00	20.00	20.00	24.00
No. 2, Southern Cin'ti	20.06	20.06	20.06	23.69
No. 2, Birmingham	16.38	16.38	16.38	20.38
No. 2 foundry, Chicago†	20.00	20.00	20.00	24.00
Basic, del'd eastern Pa.	21.34	21.34	21.34	25.26
Basic, Valley furnace	19.50	19.50	19.50	23.50
Malleable, Chicago†	20.00	20.00	20.00	24.00
Malleable, Valley	20.00	20.00	20.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.04
Ferromanganese, seab'd, carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$15.25	$15.50	$15.50	$21.25
Heavy melting steel, Phila.	14.25	14.25	14.75	19.75
Heavy melting steel, Ch'go	13.75	13.75	14.25	18.25
Carwheels, Chicago	14.25	14.25	15.25	19.25
Carwheels, Philadelphia	17.25	17.25	17.25	20.75
No. 1 cast, Pittsburgh	15.25	15.25	15.25	20.25
No. 1 cast, Philadelphia	16.25	16.25	16.75	20.75
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.75	15.25
No. 1 RR. wrot., Phila.	15.25	15.25	15.25	20.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.35
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Electrolytic copper, Conn.	10.125	10.125	10.125	14.00
Lake copper, New York	10.25	10.25	10.25	14.12½
Tin (Straits), New York	42.75	43.30	43.25	58.75
Zinc, East St. Louis	4.75	4.75	4.75	7.25
Zinc, New York	5.14	5.14	5.14	7.60
Lead, St. Louis	4.75	4.75	4.75	6.35
Lead, New York	4.90	4.90	4.90	6.50
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	17.50

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
September 7, 1938	2.300c. a Lb.	$19.61 a Gross Ton	$14.42 a Gross Ton
One week ago	2.300c.	19.61	14.50
One month ago	2.300c.	19.61	14.83
One year ago	2.512c.	23.25	19.75

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel — High	Finished Steel — Low	Pig Iron — High	Pig Iron — Low	Steel Scrap — High	Steel Scrap — Low
1938	2.512c., May 17	2.300c., July 6	$23.25, June 21	$19.61, July 6	$14.83, Aug. 9	$11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 16
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

. . . PITTSBURGH . . .

. . . No action taken yet on fourth quarter steel prices . . . Announcements may be deferred until late this month . . . Demand for steel steady but is not making anticipated gains . . . Steel scrap lower

PITTSBURGH, Sept. 7.—New business so far this week has obviously been affected somewhat by holiday influences, although total tonnages booked before the holiday began were about on a par with those of the previous week. Purchases continue on a hand-to-mouth basis but in all cases prompt shipment is being demanded. A marked upturn in general business conditions would undoubtedly find many consumers short of steel owing to the low point reached in inventories.

Steel ingot output in the Pittsburgh district, on a full seven-day basis with no correction for the Labor Day shutdown which occurred at many plants, is off three points to 30 per cent of capacity, while the Wheeling-Weirton district is off 12 points to 58 per cent.

Producers are in no hurry to announce fourth quarter prices, which may not be named before the end of this month. With the wage question still in the forefront, demand not picking up as well as was anticipated, and with action at Washington characteristically unpredictable, there is little to be lost by steel mills in postponing fourth quarter announcements for a few weeks longer. At this time there appears to be little likelihood of higher fourth quarter prices, although unlooked-for circumstances could, of course, alter this viewpoint.

No. 1 heavy melting steel is slightly easier this week, being quoted at $15 to $15.50, off 25c. a ton.

Pig Iron

Although individual purchases are not large, pig iron business in the past week is fully as good as that recorded a week ago, and the recent tendency toward improved aggregate volume continues. Jobbing foundries have been slightly more active in the past few weeks.

Semi-Finished Steel

The maintenance of a comparatively strong semi-finished steel demand for the past several weeks is one of the bright spots in the current market situation. Bookings in the past week were about on a par with the previous period and continue to reflect low consumer inventories. Individual orders are not large but diversification is increasing.

Bars, Plates and Shapes

Hot rolled bar bookings have receded slightly, due in part to holiday influences, but a fair amount of support is still emanating from a wide variety of miscellaneous sources. The volume of structural steel specifications during the past week was equally as good as in the previous week and further increases are expected in view of the substantial amount of publicly-financed projects pending. Inquiries were not quite as numerous as a few weeks ago but a fair amount of tonnage was involved in awards made.

Wire

With seasonal demand for merchant wire products expanding and heavier bookings from manufacturing plants noted, the improvement in the volume of wire and wire product orders which started several weeks ago continues. Current wire mill operations approximate 50 to 55 per cent with practically all specifications calling for prompt shipment.

Tin Plate

Consumers continue to order only urgent requirements owing to the proximity of the usual year-end price announcement. Meanwhile, operations have leveled off slightly and are estimated at a shade below 30 per cent. Some can makers have cut rather heavily into inventories, which condition is expected to result in increased specifications when the price situation has been clarified.

Sheets and Strip

Without benefit of leading sheet consumers, bookings in the past few weeks have held up exceptionally well. Inventories in many cases have reached the vanishing point and even a moderate improvement in general business conditions will be immediately reflected in increased sheet specifications.

Tubular Goods

Oil-country goods demand has become slightly heavier in the past week and, although no unusual activity is expected during the next few months, producers look for a moderate volume of business. Standard pipe specifications are about as numerous as a week ago and continue to reflect a slight improvement recently in building activity.

Reinforcing Bars

Reinforcing bar awards and new projects were in slightly less volume than a week ago, although considerable work remains in the preliminary stages. Truscon Steel Co., Youngstown, was awarded 615 tons of bars for a bridge at Lock Haven, Pa. Prices are firmer than was the case a few weeks ago.

Bridgeport Throngs to G-E Plant's "At Home"

TWENTY-FIVE thousand admission cards distributed to families at Bridgeport, Conn., on Sept. 1 brought many thousands of visitors to General Electric Co.'s Bridgeport plant in an employees' "at home," unique for industrial New England. To G-E's workers and their families Charles E. Wilson, executive vice-president, said:

"Either life must be regulated in terms of business—sinking to mere existence—or business must be developed in terms of life. We (G-E) have consistently chosen the latter course."

. . . . CHICAGO . . . .

. . . Higher operations expected next week . . . Larger buying of finished goods would bring spurt in steel orders, as consumers' inventories are low . . . Inland reduces minimum tonnage for rail orders at base price.

CHICAGO, Sept. 7.—Shutdowns over Labor Day at all local mills caused a three point drop in ingot production to 37 per cent of the district's capacity. Next week's rate may show an increase over the 40 per cent figure estimated for last week. Thirteen blast furnaces are now making iron.

It is yet too early to determine whether the expected pick-up following Labor Day will be experienced. Sentiment continues moderately strong and a quite noticeable improvement in business is anticipated late this month and next month. Inventories are low and any buying spurt of finished goods is bound to result in a wave of steel purchasing, as the policy of buying for immediate needs has not been abandoned. Lower farm income injects a note of pessimism into the scene, however.

Except for Ford and Chevrolet, all major motor car builders expect to be well along on 1939 models by the end of this month, and it is for this business that sellers of nearly all lines of finished steel are starved. By the end of October, one important producer here expects the demand for sheets, strip, wire, bars, etc., for automobile production to be quite good.

Funds are said to be available for repairs on 1000 New York Central box cars. Other railroad buying is distant, and only fill-in quantities of rails are expected over the remainder of the year. The 1000 Illinois Central box cars will be awarded next week.

Fourth quarter price announcements may be made at any time. As can be seen by the orders coming in, buyers obviously do not expect an increase, else anticipatory business would be in evidence. Consumers of tin plate are holding back, however, as considerable talk of a decrease in this item has been heard. Similar comment has been noised about regarding rails, but the possibility is not thought to have any bearing on the lack of activity.

Inland Steel Co., has lowered its former minimum of 500 gross tons to 200 gross tons in selling rails at base without an extra.

A Youngstown Sheet & Tube bond issue is to be offered this week and $17,500,000 of the proceeds will go into new producing and finishing facilities at the Indiana Harbor plant. Construction is expected to commence soon.

Pig Iron

September and October will show increases in shipments over August, according to early predictions. Furnace inventories are becoming lower and additional iron-making facilities may be started soon to build up stocks.

Structural Shapes, Plates and Reinforcing Steel

Structural contracts are not noticeably more numerous but reinforcing projects are increasing. Federal money is a factor in many but more private interests are backing work than for some time. Bar prices are said to be firmer. The New York Central has obtained funds for the repair of 1000 box cars. Other repair programs are being held up.

Sheets, Strip and Tin Plate

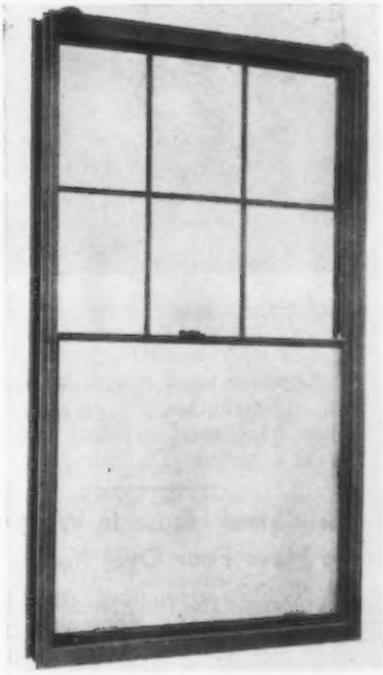
Increased production is expected from nearly all automobile plants except Ford and Chevrolet in the next fortnight. Buying as yet has been confined to relatively small tonnages. Furnace makers are inquiring for sheets, strip and tin plate in preparation for the fall season. Farm implement and tractor specifications still are being held to a minimum. Tin plate demand is light pending an expected price announcement for the next contract period.

Bars

Carbon bars are not yet heavily in demand as motor car and farm equipment manufacturing operations are at comparatively low levels. Alloy steel bars are being taken by some of the accessory and parts makers. Jobber demand is fairly good.

Wire and Wire Products

From Sept. 15 on manufacturing wire demand is expected to be good as automobile production increases. Interest in merchant products is holding up well and a good fall demand is looked for after harvest. Current bookings consist of many requests for quick shipment for fill-in purposes.



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THIS illustration shows Truscon Steel Co.'s new residential double-hung Bonderized window which features tubular sash members, spring balances equipped with Enduro stainless steel tapes instead of weights and cords, spring bronze weather stripping, brush cadmium finished hardware, flush installation of screens, and Tempryte storm windows. Five window types in 24 sizes cover all residential requirements, Truscon reports.

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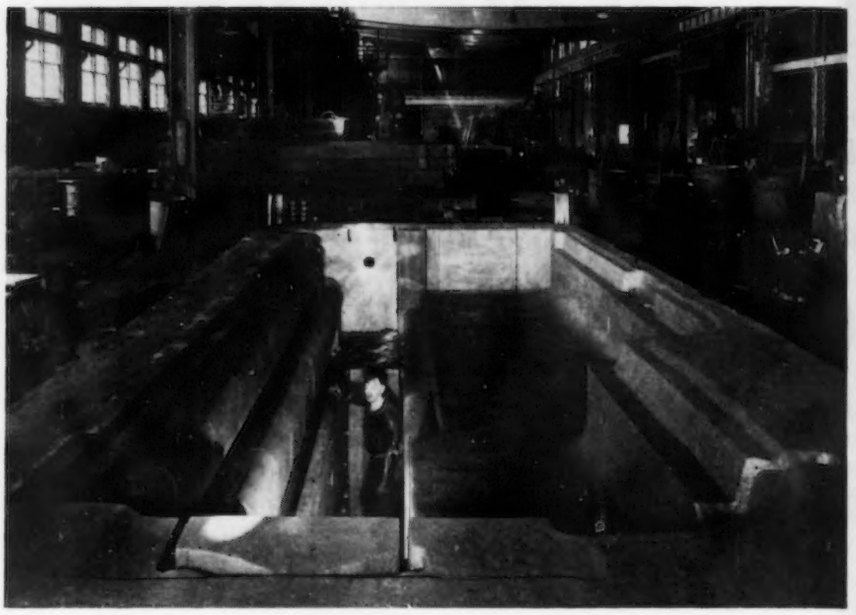
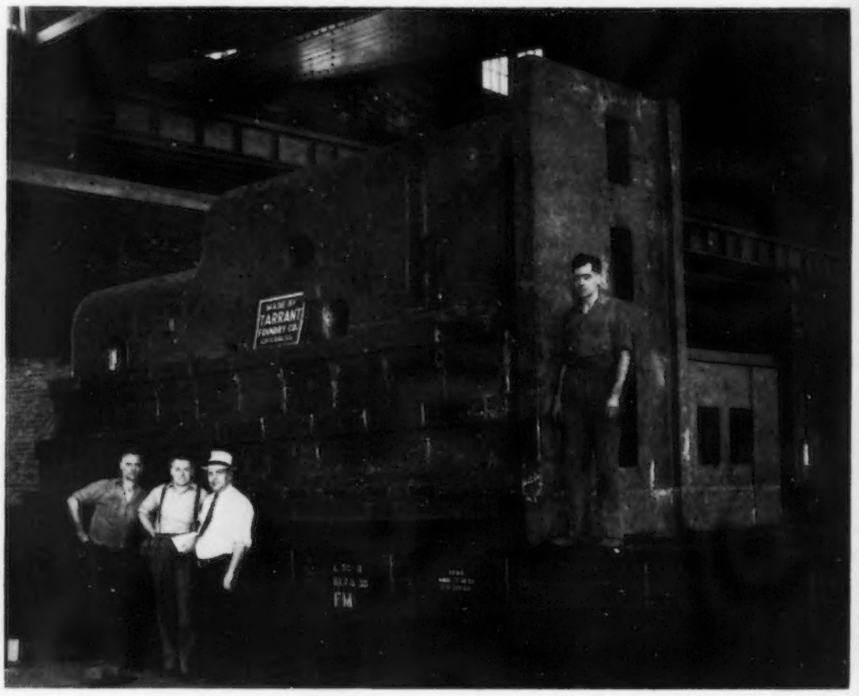
A Semi-Steel Casting Of Unusual Size

ONE of the largest semi-steel castings ever made in Chicago was shipped last week to the Ingersoll Milling Machine Co., Rockford, Ill., by the Tarrant Foundry Co., 1338 Cortland Street, Chicago. Requiring 65 days work, and measuring 22 ft. long, 10 ft. wide, and 12 ft. deep, the casting weighs slightly more than 40 tons and will become a part of an immense milling machine, the 30-ton bed casting for which was completed only recently.

One of the problems encountered in the making of the casting was the danger of water seeping into the mold. To offset this possibility, a pit 14 ft. deep, 30 ft. long, and 16 ft. wide was constructed. More than 45 tons of molten metal was poured into the mold. Established in 1880 the Tarrant Foundry Co. is one of the pioneers in heavy castings work in Chicago.



SAID to be the largest semi-steel casting made in Chicago, this 40-ton milling machine housing casting was poured in the mold pictured in the accompanying illustration.



..BIRMINGHAM..

. . . Steel bookings in upward trend . . . More open hearths on this week.

BIRMINGHAM, Sept. 6. — There is a steady, upward trend in steel bookings, furnished principally by an active demand for sheets, wire products, cotton ties, shapes and plates. The sharp increase in iron and steel operating schedules last month seems to be on firm basis and will likely continue without recession for some time.

Thirteen blast furnaces are now in production, as compared with the low point of five in July. On September 1 Sloss-Sheffield Steel & Iron Co. blew in its No. 2 city furnace, as scheduled. Tennessee Coal, Iron & Railroad Co. is now operating six; Republic Steel Corp., three; Sloss-Sheffield Steel & Iron Co., two; Woodward Iron Co., two.

Open hearth operations last week ranged from 9 to 11 units. Tennessee Coal, Iron & Railroad Co., operated five, six and seven at various times during the week; Republic Steel, four all week. This week the Tennessee company has eight scheduled and Republic Steel, four; a total of 12.

The pig iron market has settled to a routine basis. There is little new tonnage, as most foundries have already bought for the present. Furnaces have good backlogs and shipments continue at a fair rate.

New Steel House in West To Have Four Oval Rooms

AN ultra-streamlined steel house, quakeproof, fireproof, waterproof and with four of its five rooms oval in shape, will be erected at the 1939 Golden Gate International Exposition at San Francisco.

Builders of the home, which will be air-conditioned through slots beneath each window, with the air filtered through concealed sponges, are B. J. Compton and J. F. Jordan, designers, of Bakersfield, Cal. The structure, in which steel laths will reinforce the prefabricated inner and outer walls, contains no rooms with corners.

. . . CLEVELAND . . .

. . . Orders in smaller volume, possibly because of holiday influences . . . A moderately active fall is expected, however . . . Announcements of fourth quarter prices are being withheld

CLEVELAND, Sept. 7.—Orders have slowed down materially during the past six days, doubtless due to Labor Day influences. Ingot production this week also reflects holiday shutdowns which occurred in some but not all mills in the Valleys and in the Cleveland-Lorain district.

The poor start, however, has not dampened hopes that this month will bring improvement comparable to that in August. Continued diversified demand from miscellaneous consumers, plus requirements of the automotive industry, and publicly-financed programs of construction and shipbuilding, are the principal strong points upon which are based expectations for a moderately active fall. The low state of consumer inventories generally is a potential factor for strength.

Employment has gained considerably in northern Ohio during the past month. A large number of salaried employees, some of them in the steel industry, have received partial pay restorations through more hours' work per week.

The price policy for fourth quarter, still to be announced, has been given long and serious consideration. Apparently the decision is being reserved until after the ruling by the Government Contracts Board or until some other event points the way.

The ingot rate for Youngstown and nearby cities this week is down six points to 38 per cent and for Cleveland-Lorain down four points to 43 per cent.

Iron Ore

Up to Sept. 1, 10,872,490 gross tons of Lake Superior iron ore had been brought down from upper Lake ports this season, against 45,438,131 tons in corresponding period last year, a decrease of 34,565,641 tons. Shipments during August amounted to 3,325,715 tons compared with 10,811,381 tons in August, 1937, a decrease of 7,485,666 tons, according to the Lake Superior Iron Ore Association.

Pig Iron

Principal interest centers upon prices for the last quarter, which should be announced any time now. The majority of producers and a large section of consumers share the opinion that a step should be taken toward helping to end the present profitless condition, but whether the time is ripe for such action is the debated question. Shipments are holding at the improved level gained during August. New buying has been light for several weeks. Releases from automotive foundries are expected to be heavier toward the latter part of this month.

Bars, Shapes and Plates

With successive gains shown in July and August, an active September from the standpoint of buying would place bar mill operations at a very comfortable level. Considerable seems to depend upon the automotive industry, as the railroads are inactive and some Middle Western implement manufacturers who normally buy at this time indicate they have sufficient material on hand and will not make commitments unless the outlook brightens markedly.

Bethlehem Steel Co. has been awarded 1400 tons of shapes for the three bridges at the local clover leaf intersection and Patterson-Leitch Co. has been awarded 550 tons of reinforcing bars for the same project. Bethlehem has been given 130 tons for an Oberlin gymnasium.

Wire and Wire Products

Activity of cushion spring manufacturers in particular and other users of manufacturing wire in general continues on the upgrade. Inventories of the majority of buyers remain low and a jam could easily develop with a short period of aggressive purchasing. In the experience of some producers, August was the high point of the year from the standpoint of bookings, exceeding March by a very small percentage. Merchant products are moving slowly at present, but the latter part of September is counted upon for the beginning of a pick-up. Nail prices continue erratic on the Eastern Seaboard and in the Southwest.

Sheets and Strip

Whether the large volume users will become active in the market to any great extent over the near future remains an open question, but in certain cases some of these consumers are still unable to ascertain the probable fall demand and consequently are cautious in specifying steel. Meanwhile, from diversified miscellaneous sources the volume of new business continues satisfactory, with immediate deliveries desired. From the producers' standpoint the financial outlook has appeared increasingly dismal recently. On top of mounting deficits, a source of annoyance has been the widely varied and somewhat loose interpretations of quantity deductions.

....BUFFALO....

. . . Bethlehem puts on another open hearth . . . further improvement expected.

BUFFALO, Sept. 7.—The addition of another of the 150-ton capacity open-hearths from its No. 3 unit, announced last week by the Bethlehem Steel Co., is now in effect. This increase places the number active there at 15, five of which are in the newer unit. Operations at the other mills are unchanged: Republic Steel Corp. has four furnaces on and Wickwire-Spencer two.

Although increased activity has been noted recently in all lines, mill operators do not term it well-defined. Orders are easier, but with the holidays passed, producers are confident of substantial improvement. The shape market has become stronger and greater activity is expected momentarily in reinforcing bars. Warehousemen and pig iron producers report no current change in demand.

Bids on the general contract for the Lakeview housing project are due Sept. 21. The job will total $5,000,000 and is under the supervision of the Buffalo Municipal Housing Authority. Steel required will include 1000 tons of reinforcing bars, 500 tons of steel joists and 100 tons of structural.

An addition to the Lockport Hospital calls for 100 tons of shapes. Bids are due Sept. 9. Bids will be in Sept. 12 on 100 tons of structural to be used in a new Kresge's store.

Ingot Output in August Largest Since October, 1937

STEEL ingot production totaled 2,546,988 gross tons in August, an average of 574,941 tons a week, according to the monthly report of the American Iron and Steel Institute. The rate of operation averaged 42.85 per cent. It was the best month since October, 1937, when operations averaged 58.31 per cent.

During the first eight months of the year the industry produced 15,348,190 tons of ingots compared with 38,193,090 tons in the corresponding period last year.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS

(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
1937	Open-Hearth	Bessemer	Monthly	Weekly		
January	4,349,024	292,209	4,718,436	1,065,110	4.43	81.32
February	4,011,852	331,629	4,414,699	1,103,675	4.00	84.27
March	4,730,943	403,400	5,218,326	1,177,952	4.43	89.94
1st Quarter	13,091,819	1,027,238	14,351,461	1,115,977	12.86	85.20
April	4,600,418	388,783	5,070,867	1,182,020	4.29	90.25
May	4,686,052	382,671	5,151,909	1,162,959	4.43	88.79
June	3,832,082	284,615	4,184,723	975,460	4.29	74.48
2d Quarter	13,118,552	1,056,069	14,407,499	1,107,417	13.01	84.55
1st 6 Months	26,210,371	2,083,307	28,758,960	1,111,672	25.87	84.88
July	4,147,227	335,456	4,556,304	1,030,838	4.42	78.48
August	4,425,998	373,259	4,877,826	1,101,089	4.43	83.83
September	3,950,899	268,472	4,289,507	1,002,221	4.28	76.30
3d Quarter	12,524,124	977,187	13,723,637	1,045,212	13.13	79.58
1st 9 Months	38,734,495	3,060,494	42,482,597	1,089,297	39.00	83.09
October	3,148,321	188,715	3,392,924	765,897	4.43	58.31
November	2,004,890	113,885	2,154,365	502,183	4.29	38.23
December	1,362,010	86,833	1,473,021	333,263	4.42	25.37
4th Quarter	6,515,221	389,433	7,020,310	534,270	13.14	40.68
Total	45,249,716	3,449,927	49,502,907	949,423	52.14	72.38
1938						
January	1,604,363	99,991	1,732,764	391,143	4.43	29.15
February	1,550,772	125,493	1,703,726	425,932	4.00	31.74
March	1,822,398	157,737	2,012,406	454,268	4.43	33.85
1st Quarter	4,977,533	383,221	5,448,896	423,709	12.86	31.58
April	1,762,315	131,644	1,925,166	448,757	4.29	33.44
May	1,647,049	130,590	1,806,805	407,857	4.43	30.39
June	1,519,589	118,688	1,638,277	381,883	4.29	28.46
2d Quarter	4,989,326	380,922	5,370,248	412,778	13.01	30.76
1st 6 Months	10,055,001	764,143	10,819,144	418,212	25.87	31.17
July	1,854,076	127,982	1,982,058	448,429	4.42	33.42
August	2,350,199	196,789	2,546,988	574,941	4.43	42.85

NLRB Schedules Election For Beloit Iron Works

WASHINGTON.—The National Labor Relations Board has scheduled an election for employees of 10 departments at the Beloit (Wis.) Iron Works, manufacturers of paper making machinery, to determine if they desire collective bargaining representation by the AFL's machinists' union. The board said the company declined to recognize the IAM as the exclusive bargaining agent until it was compelled to do so by legal process. There is no controversy between the parties as to the appropriate unit for representation, the board said.

. . . BOSTON . . .

. . . New England manufacturers are adding to working forces.

BOSTON, Sept. 6.—New England consumer interest in pig iron the past week continued to center in small scattered lots, with aggregate sales inconsequential. There are indications here and there, however, that business from now on will gather momentum and that possibly consumption of pig iron will increase. The Lynn, Mass., plant of the General Electric Co. has put 6000 employees back to work, another manufacturing company 1000, and numerous smaller firms have increased the number of operatives. Occasionally furnace representatives have received European inquiries for pig iron, but because grades desired are not within the scope of Northern furnaces and because of a differential between Northern and Southern iron prices, little business has resulted here. However, 753 tons of pig iron recently left this port for Germany.

. . . CINCINNATI . . .

. . . Demand for sheets steady at 40 to 45% of mill capacity.

CINCINNATI, Sep. 6. — Sheet demand showed relatively no change the past week despite the holiday. Consumers were in the market for about 40 to 45 per cent of mill capacity. Analysis of business revealed a small gain in automotive demand, but otherwise users failed to buoy hopes of fall revival. The galvanized demand is still well above market averages, although mill interests indicate this will level off before long.

While the pig iron market feeling is more optimistic, ordering fails to give any substance to trade attitude. Except for a few small scattered orders, district sellers are without appreciable new business. Shipments on contracts are above those of early last month. Some melters are stocking a little iron, although the volume of shipments is not sufficient to allow large accumulations.

Standing, Superintendent For Bethlehem, Dies

A. J. STANDING, superintendent of the electrical department at Bethlehem Steel Co.'s Bethlehem works, died Sept. 3. A graduate of Lehigh University in 1911, he was active in various technical societies and formerly was president of the Association of Iron & Steel Engineers.

. . PHILADELPHIA . .

. . . Eastern Pennsylvania operations at 24 per cent . . . Mills figure on 1000 tons of license tag stock . . . Pig iron moderately active, scrap listless for the moment.

PHILADELPHIA, Sept. 7.—Order books are pretty slim for the first few market days in September, and a number of sellers are beginning to look for the month to show a total turnover not much greater than that of August. Toward the month's end, however, heavier automobile, shipyard and constructional steel releasers are expected to take hold and boost the open hearth activity at least moderately. Possible improvement in the railroad and tin plate markets is hoped for but not generally anticipated by that early date.

At the moment, mills in this immediate territory are operating fractionally ahead of deliveries, but ingot piling is quite moderate. Alan Wood has two open hearths on, Central three, and Worth two, and even with the closed Pencoyd plant tending to keep the district rate down, better activity in other district mills has resulted in a slight improvement in the aggregate rate. However, the holiday period has cut the week's total activity to 24 per cent. A rise to 28 per cent is likelv next week.

Scrap is currently listless, with the market untested pricewise but apparently enjoying a very optimistic undertone.

Fourth quarter steel prices should be out now, but no mill has come forward with an announcement, the supposition being that action is being delayed until the Government takes action on minimum wage levels for mills supplying steel to it. In the meantime, very few customers are inquiring about fourth quarter deliveries.

Pig Iron

Very few furnaces have announced fourth quarter prices, but none the less the market fully expects reaffirmation in all directions. Foundry melt has shown no improvement, but demands of iron are possibly a little more brisk, arising perhaps from a tendency to close up holes in stock piles at this time in view of the fact that lower prices are extremely unlikely and higher quotations before the year's end not nearly so unlikely.

Plates, Shapes and Bars

The miscellaneous plate market is very dull, and the only life in this commodity during the week came from some small releases by Sun Shipbuilding for C-2 boats. The constructional steel market continues to improve. About 6000 tons of shapes are currently active here, but no award of over 100 tons was made during the week. Reinforcing steel also is showing slight improvement in volume but not in the price situation. Awards of the week were 180 tons of bars to Bethlehem for the Philadelphia Navy Yard, and 220 tons of mats to the same company for a highway project in Westmoreland County. A bridge in the same county accounted for 320 tons of bars, which went to Jones & Laughlin Steel Corp.

Sheets and Strip

Purchases traceable to the automobile industry are the major support of this market, although both the storage tank and stove builders have shown a slight improvement, and even warehouses have been into the market for mixed carloads. Some sellers profess to be discouraged by the thinness of the miscellaneous market. A number of mills are bidding Sept. 21 on 1000 tons of 25 gage hot rolled pickled license tag stock for the State of Pennsylvania, although delivery over all of 1939 is specified. Just what price arrangements are being made will be unknown until tenders are opened.

Imports

During the past week 5990 tons of manganese ore was received from India; 5 tons of manganese ore from France; 10 tons of bar steel, 50 tons of tube steel and 15 tons of forgings from Sweden.

..SAN FRANCISCO..

. . . New bids to be taken on Tacoma Narrows Bridge.

SAN FRANCISCO, Sept. 6.—Bids on the 17,500-ton Tacoma Narrows Bridge, Tacoma, Wash., were returned to bidders unopened Friday, the day set for opening. State engineers said that certain parts of the bridge foundations would be redesigned and a new bid call issued in about 30 days. The action came as a surprise to structural steel men, who had come from all parts of the United States for the opening. The bridge is the largest of suspension type to be up for bidding on the Pacific Coast since San Francisco's Golden Gate Bridge. As originally designed, it involved approximately 10,528 tons of structural steel, 231 tons of H-piling, 200 tons of cast and forged steel, 1071 tons of steel sheet piling, 3817 tons of cable wire, and 1618 tons of reinforcing bars.

Preliminary tonnage takeoffs on the $4,500,000 graving dry dock to be constructed at the Bremerton, Wash., Navy yard indicate that approximately 1300 tons of reinforcing bars will be required. Nearly 1450 tons of bars will be needed for concrete lining a tunnel approach to the Golden Gate Bridge, San Francisco. The approach is up for bids Sept. 21.

Wharf and terminal improvements at Port Allen, T. H., involve 850 tons of reinforcing steel, 400 tons of shapes, and 110 tons of rails.

The United States Engineer, San Francisco, has cancelled bid call for 2495 tons of sheet piling, set for opening today.

The construction contract for a hangar at Lowry Field, Colo., involving 1200 tons of shapes, has been awarded to Madsen Construction Co., Minneapolis.

Brazilian Machinery Order To McNally-Pittsburgh Co.

THE McNally-Pittsburgh Mfg. Co., Pittsburgh, Kan., has received an order for 20 cars of machinery for a coal washing plant to be built in Brazil. The order was placed by the Consorcio Administrador de Emprezas de Mineracao.

. . . . NEW YORK. . . .

. . . Holiday influences reduce volume of steel buying . . . Announcement of new tin plate price expected momentarily.

NEW YORK, Sept. 7.—Generally ascribed to holiday influences, the volume of steel business placed in this market during the past week was smaller than that of the preceding week. With Labor Day, the traditional turning point from summer to autumn activity, now left behind, steel people were moderately hopeful of a sustained improvement in business.

An announcement of the tin plate price that will be effective beginning Oct. 1 is expected momentarily. Buyers are sure there will be a reduction and hence are ordering nothing but the most necessary requirements. In some instances orders are being placed with an understanding that they will be billed at the price in effect at time of shipment. There have been no reliable intimations as to what the new price will be, but the general expectation is $5 or $5.10 a base box.

Pig Iron

Bookings in the past week were extremely light. Shipments, reflecting the effects of the holiday period on casting schedules, were also very light, but are still in excess of new orders. Orders placed in the past week represented the more pressing needs of the few foundries in this area that are fairly active. Although no Northern furnace has as yet formally announced fourth quarter prices, it is generally expected that present prices will prevail to the end of the year. Pending export tonnages include 500 tons for China, about 300 for the Continent and 100 tons for South America. China recently purchased 500 tons, dividing the order between two domestic producers.

Reinforcing Bars

The volume of both awards and inquiries in the past week was less than the heavy volume of the preceding week. Pending work is fairly heavy and includes 792 tons for an elevated highway in Queens and 5000 tons for a housing project, also in Queens. Bids on 10 highway projects in New York State, involving about 400 tons of bars and mesh, will close Sept. 27. Buildings for the World's Fair continue to account for small tonnages.

Plates and Sheets

The volume of plate sales in the past week was slightly above the previous week, due primarily to jobber restocking. Bookings of most sellers in August were just about equal to those of July, although in two cases a very small increase was noted. Sentiment is still on the optimistic side with respect to the long term view, but outside of the New York Central's car program, there is little in the immediate picture to suggest any sudden change from the present sales level.

Sheet sales in the week just passed showed an encouraging rise over the preceding week, with two sellers experiencing the highest weekly sales total so far this year. Purchases by stove makers of both galvanized and plain grades and some replenishment of stocks by jobbers were primarily responsible for the betterment.

CANADA

. . . Two airplane plants may be established to fill British contracts.

TORONTO, Sept. 6.—Announcement was made at the week-end that large contracts for airplanes would be awarded almost immediately by the British Government, with at least two manufacturing plants to be established in Canada. A complete plant, it is stated, will be located at the new Malton airport and the other near Montreal, Que. John Inglis Co. has started work on a contract for machine guns for Britain and other orders are said to be pending.

The automotive industry is getting ready for fall operations.

Machinery and tools have been in good demand.

. . . . ST. LOUIS. . . .

. . . Pig iron melt gaining . . . steel buyers marking time.

ST. LOUIS, Sept. 7.—Consumers of finished steel are marking time as far as buying is concerned pending the announcement of prices for fourth quarter. Buying is likely to continue on the present basis of making commitments only for projects in hand unless there is a change in the price situation that will warrant forward purchasing, in the opinion of factors here.

Because of the piling up of inquiries covering public works projects, estimating of quantities is being delayed. The Smith-Cooke Construction Co., St. Louis, is low bidder on the general contract for two warehouses at Scott Field, Belleville, Ill. Bids are due Sept. 20 for the State Cancer Hospital at Columbia, Mo., requiring approximately 250 tons of reinforcing bars.

Warehouse business for August is reported to be slightly better than July because the former had more working days, but is approximately 20 per cent behind August last year. August showed a slight pick-up in galvanized sheets and in structurals.

Melters of pig iron are awaiting announcement of fourth quarter prices before buying. The melt is on the increase. Implement manufacturers have gone into September with a slightly better melt than in August. Because of orders from manufacturers serving the automobile trade, jobbing foundries in the St. Louis district are much more active than in August.

Ingot operations are up to 50 per cent of capacity.

St. Louis Foundrymen Conference on Oct. 7-8

THE St. Louis district chapter of the American Foundrymen's Association will hold its second annual conference at the Missouri School of Mines and Metallurgy, Rolla, Mo., Oct. 7-8. Secretary-treasurer of the chapter is John W. Kelin. The conference program includes these addresses:

"Mechanical Charging with Cupola Control," M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill.; "Operation of Hot Blast Cupola," A. O. Nilles, Griffin Steel Co., Kansas City, Kan.; "Malleable Iron, Its Composition and Manufacture," Leon Wise; "Short Cycle Anneal," Hyman Bernstein, Deere & Co., Moline, Ill.; "Choosing and Using Non-Ferrous Alloys," J. W. Kelin, AS&R Co., St. Louis; "Safety in Foundries," J. O. Johnson, American Optical Co., St. Louis; "Testing and Control of Molding Sands," H. W. Dietert, Harry W. Dietert Co., Detroit.

"Molding Sand Problems in the Foundry," Horace Deane, Deere & Co.; "Limitations of Refractories for Foundry Use," M. C. Booze, Charles Taylor Sons Co., Cincinnati; "Refractories from Missouri Clays," C. M. Dodd, professor, Missouri School of Mines; "Limitations of the Spectograph," S. R. B. Cook, Missouri School of Mines; "Practical Application of Metallography," Carl H. Morken, Carondolet Foundry Co., St. Louis; "The Manufacture of Steel Castings for High Pressure, High Temperature Service," Lee Everett, Key Co., East St. Louis, Ill.; "Blow Holes in Steel Castings," Joseph D. Walsh, Scullin Steel Co., St. Louis.

. . .NON-FERROUS. . .

. . . Buyers maintain a cautious attitude; nearby positions chief interest . . . Zinc stocks lowered 2831 tons in August as shipments rise 2682 tons . . . Formation of lead cartel brings heavy buying here and abroad.

NEW YORK, Sept. 7.—An anticipated pre-holiday quietude prevailed in the non-ferrous markets in the past week, keeping sales somewhat below the level of the previous week. Coupled to the holiday was the price weakness that developed in the foreign markets in the early part of the week, and which had a sympathetic effect on traders here. However, a temporary subsiding of war fears abroad, firmed prices over the weekend, and with the announcement today of the formation of a lead cartel, all signs of weakness were dissipated. Domestic copper sales for the month through Saturday totaled 1680 tons, all booked at the unchanged price of 10.125c. per lb., Connecticut Valley, for electrolytic metal. Bookings by the cartel group averaged about 1500 tons a day in the past week, with armament purchases continuing to account for a large share of the business. The foreign price this morning was in the neighborhood of 10.22c. per lb., c.i.f., usual base ports, as against 10.08c. a week ago.

The Week's Prices. Cents Per Pound for Early Delivery

	Aug. 31	Sept. 1	Sept. 2	Sept. 3	Sept. 6	Sept. 7
Electrolytic copper, Conn.*	10.125	10.125	10.125	10.125	10.125	10.125
Lake copper, N. Y.	10.25	10.25	10.25	10.25	10.25	10.25
Straits tin, spot, New York	43.25	43.20	43.05	....	42.95	42.75
Zinc, East St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Zinc, New York	5.14	5.14	5.14	5.14	5.14	5.14
Lead, St. Louis	4.75	4.75	4.75	4.75	4.75	4.75
Lead, New York	4.90	4.90	4.90	4.90	4.90	4.90

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.00c. a lb., prompt, f.o.b., New York.
Antimony, American, 11.25c. per lb., prompt shipment, New York.
Quicksilver, $76.00 to $77.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.75c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	44.00c. to 45.00c.
Tin, bar	46.00c. to 47.00c.
Copper, Lake	11.375c. to 12.375c.
Copper, electrolytic	11.125c. to 12.125c.
Copper, castings	10.625c. to 11.625c.
*Copper sheets, hot-rolled	18.25c.
*High brass sheets	16.75c.
*Seamless brass tubes	19.50c.
*Seamless copper tubes	18.75c.
*Brass rod	12.75c.
Zinc, slabs	6.25c. to 7.25c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.50c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	6.25c. to 6.625c.
Lead, sheets, cut	7.75c.
Antimony, Asiatic	15.00c. to 16.00c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	29.25c. to 30.25c.
Babbitt metal, commercial grade	20.00c. to 50.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits, pig	47.00c.
Tin, bar	49.00c.
Copper, Lake	11.125c. to 11.375c.
Copper, electrolytic	11.125c. to 11.375c.
Copper, castings	10.925c.
Zinc, slabs	7.50c. to 7.75c.
Lead, American pig	5.40c. to 5.65c.
Lead, bar	8.50c.
Antimony, Asiatic	17.75c. to 18.00c.
Babbitt metal, medium grade	21.00c.
Babbitt metal, high grade	51.00c.
Solder, ½ and ½	28.00c.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.125c.	8.875c.
Copper, hvy. and wire	7.125c.	7.625c.
Copper, light and bottoms	6.375c.	6.625c.
Brass, heavy	4.375c.	4.875c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.875c.	8.375c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or compos. turnings	6.375c.	6.875c.
Lead, heavy	3.50c.	3.875c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	10.75c.	12.25c
Zinc	2.125c.	3.375c.

Tin

The chief characteristic of the market at present is a complete lack of consumer interest, despite the declining prices. This condition naturally makes for a very dull market. Prices over the past week worked down from 43.25c. on Wednesday to 42.75c. today for Straits metal, New York. The price a week ago was 43.30c. The Navy Department is in the market again, this time for 100 tons. Prices on first call in London this morning were £190 15s. for cash standards and £191 15s. for three months metal, as against £192 and £193 a week ago.

Zinc

Demand in the past week showed no substantial change over the previous week, but shipments continued to move into consumption in increasing volume. Nearby delivery dates accounted for the bulk of the week's business, and prices remained unaltered at 5.14c. per lb., New York. The London price was up slightly this morning, with 2.84c. being bid on spot metal. Domestic stocks in August were reduced to 143,377 tons, a decline of 2831 tons from the July position. Production in August was 33,676 tons, as compared with 30,362 in July, and shipments were 36,507 tons against 33,825 tons.

Lead

Sales in the pre-holiday week were about 300 tons less than in the previous week, but judging by the demand this morning, the present week's volume is likely to touch a new high. The spurt this morning was caused by the announcement of the formation of a lead cartel with the reported aim of maintaining prices between £16 and £18. The current London quotation is around £14.

Average Prices

The average prices of the major non-ferrous metals in August, as based on quotations appearing in THE IRON AGE, were as follows:

	Per lb.
Electrolytic copper, Conn. Valley	10.125c.
Lake copper, Eastern delivery	10.25c.
Straits tin, spot, New York	43.256c.
Zinc, East St. Louis	4.75c.
Zinc, New York	5.14c.
Lead, St. Louis	4.75c.
Lead, New York	4.90c.

IRON AND STEEL SCRAP

. . . Steel scrap 25c. lower at Pittsburgh . . . Composite price $14.42 . . . Export sales made to Italy and Japan.

SEPT. 7.—With domestic buying of scrap at least temporarily abated, attention this week is diverted to the export market, where fresh activity has developed. There were sales to Japan and to Europe. Italy is said to have been the principal buyer in Europe. Germany was at first reported to have bought, but later it was said that pig iron, instead of scrap, was bought in Europe, possibly in England, which has a surplus of pig iron. The Italian purchase is reported at 80,000 tons by reliable sources, though one estimate was as high as 135,000 tons. The price paid by Italy is said to have been about $15, f.a.s., which is $5 above the previous purchase of a few months ago. Japanese purchases consisted of railroad steel, No. 1 and No. 2, with prices averaging about the same as Italy paid. It is said that Japan may buy several hundred thousand tons over the next few months in preparation for rehabilitation of devastated regions in China.

Domestic scrap trade is largely marking time, but meanwhile weakness has developed in spots. Steel scrap is off 25c. at Pittsburgh and 50c. at Cleveland, being unchanged at Chicago and Philadelphia. Export sales made tend to strengthen the market provided some domestic buying takes place also. THE IRON AGE scrap composite price is 8c. lower at $14.42.

Pittsburgh

The market is far from clarified. One consuming interest purchased a few thousand tons of No. 1 heavy melting in the past week at $15 a ton but other points in the district are paying at least $15.50 a ton, delivered. In addition to these factors, brokers themselves are paying all the way from $15 to $15.50 for No. 1 heavy melting, although some distress material has been bought recently at below $15 a ton. For these reasons, the market has leveled off 25c. a ton, No. 1 steel being quotable this week at $15 to $15.50, but still remaining in a highly sensitive condition. The future trend depends somewhat on steel mill operations, which are marking time this week because of holiday shutdowns.

Chicago

A $14 top on heavy melting steel holds this week with brokers bidding $13.50 to secure material, but not desiring it particularly. No mill consumer is seen likely to enter the market in the near future. A railroad list was sold last week at 50c. less than the previous sale, $14.84 gross being realized.

Cleveland

The market continues to mark time, consumers and dealers awaiting the extent of the expected upturn which Labor Day was supposed to bring. All prices remain nominal and are based to a large extent on other markets, but are adjusted this week for better alinement. On track for out-of-town shipment, No. 1 heavy melting steel has brought $13 here recently.

Youngstown

While releases remain light, scrap is coming out slowly. The opinion is generally held here that present levels cannot be maintained indefinitely; that quotations soon will be forced to move either up or down, depending principally upon the volume of business available for mills.

Buffalo

Continuing strong despite an absence of sales, the scrap market remained unchanged this week with one exception. Stove plate jumped $1 to $13 to $13.50. Small sales have been reported at these figures. Heavier grades are moving slowly and no sales of any consequence have been noted.

St. Louis

An East Side mill bought 8000 tons of heavy melting steel, mostly No. 2 and some No. 1, on the present basis of prices quoted in THE IRON AGE. Four dealers shared in the order, which is for delivery over the next 60 days. Prices are unchanged and strong, as a result of this purchase. Railroad lists include: St. Louis Southwestern, 500 tons; Missouri Pacific, 2000 tons; Wabash, 1700 tons; Pennsylvania, 15,000 tons; and New York, Chicago & St. Louis, 1000 tons. It is unlikely that any of the three last named lists will reach this market.

Cincinnati

Increased activity in nearby areas failed to aid the local scrap market. No changes in prices have been made, although resistance has disappeared and small amounts of material are changing hands at present quotations. While steel scrap holds chief interest, some foundry material is moving.

Detroit

Automotive lists in the week before Labor Day included some erratic variation from prices that have prevailed during the last month. Blast furnace items were off varying amounts as much as $1.75 in some cases. Sheet clippings, busheling and bundles moved erratically upward, with busheling and bundles showing the sharpest action. In one sale, bushelings brought a higher price than bundles. With a peak of $12.90 reached on busheling and $12.80 on bundles, the top prices were for the most part single buys of relatively moderate tonnages.

Boston

For domestic delivery, bundled skeleton is about 50c. a ton higher, but prices for other materials are unchanged and nominal because of a lack of business. The export market is a little easier because $13 a ton, delivered dock, for No. 1 heavy melting steel has disappeared and because of the limited passing business. One boat is loading scrap here, but tonnage details are withheld. Last week 62 tons of boiler tubes left for Rotterdam, the first export noted in some time.

New York

Scrap transactions here are still suffering from post-holiday lassitude, but at least an expectation of an early strengthening tendency is displayed in most quarters. Moderate quantities of material are being processed and passed along to export barges or to certain eastern Pennsylvania mills, with a few specialties traveling to the Pittsburgh area, the entire list at the moment being practically unchanged pricewise from a week ago. Most significant news is that the European Cartel has purchased additional material and that Japan has been in the market for the past several days. The natural bullishnes of such news is tempered by the fact that the 80,000 tons taken by the Cartel is already pretty well accounted for in this country, and the Japanese deliveries will leave primarily from the Pacific Coast. Those brokers who took the last Cartel order at very low prices received the bulk of the latest purchase, the current price being undisclosed but thought to be high enough to sweeten the bad orders of the past to a considerable extent.

Philadelphia

Brokers and mills in this territory are in a position of temporary stalemate, with either perhaps in a position to force a sale but neither inclined to do so. Prices are uncertain, being untested for some time, but the market's undertone is more on the optimistic side, taking its cue of course from the small but persistent rise in steel-making operations and from the entrance of European and Far East buyers into the picture again over the past week. That sentiment here has no sympathy for price weakness is well attested by the Budd Co. decision to sell only 500 tons of September compressed bundles at a price estimated as being 50c. under that of last month, the remaining 1500 tons of bundles to be held over until the October list is released or when and if a better price develops.

RAILROAD BUYING

J. M. Huber Corp. has placed an order for four hopper cars with American Car & Foundry Co.

New York Central has received approval for National City Bank loan of $5,000,000, with RFC guarantee, to purchase 28,600 tons of rails, and material for repairs to 185 locomotives, 300 passenger cars and 1000 freight cars.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $15.50
Railroad hvy. mltng.	15.75 to 16.25
No. 2 hvy. mltng. steel	13.75 to 14.25
Scrap rails	16.00 to 16.50
Rails 3 ft. and under	16.50 to 17.00
Comp. sheet steel	15.00 to 15.50
Hand bundled sheets	14.00 to 14.50
Hvy. steel axle turn.	13.50 to 14.00
Machine shop turn.	9.50 to 10.00
Short shov. turn.	9.50 to 10.00
Mixed bor. & turn.	8.25 to 8.75
Cast iron borings	8.25 to 8.75
Cast iron carwheels	14.50 to 15.00
Hvy. breakable cast	12.50 to 13.00
No. 1 cupola cast	15.00 to 15.50
RR. knuckles & cplrs.	17.00 to 17.50
Rail coil & leaf springs	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Low phos. billet crops.	17.50 to 18.00
Low phos. punchings.	16.00 to 16.50
Low phos. plate	16.00 to 16.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	12.50 to 13.00
Hydraulic bund., new	14.00 to 14.50
Hydraulic bund., old	11.00 to 11.50
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast	15.50 to 16.00
No. 1 cast	16.00 to 16.50
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	15.50 to 16.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	16.50 to 17.00
Couplers & knuckles	16.50 to 17.00
Rolled steel wheels	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	19.00 to 19.50
No. 1 RR. wrought	15.00 to 15.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	10.50 to 11.00
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$13.50 to $14.00
Auto. hvy. mltng. steel alloy free	12.00 to 12.50
No. 2 auto. steel	11.50 to 12.00
Shoveling steel	13.50 to 14.00
Factory bundles	12.50 to 13.00
Dealers' bundles	12.00 to 12.50
Drop forge flashings	10.50 to 11.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old	5.25 to 5.75
Rolled carwheels	16.00 to 16.50
Railroad tires, cut	16.50 to 17.00
Railroad leaf springs	16.50 to 17.00
Steel coup. & knuckles	16.00 to 16.50
Axle turnings	12.50 to 13.00
Coil springs	17.00 to 17.50
Axle turn. (elec.)	13.00 to 13.50
Low phos. punchings.	16.50 to 17.00
Low phos. plates 12 in. and under	16.50 to 17.00
Cast iron borings	7.00 to 7.50
Short shov. turn.	7.50 to 8.00
Machine shop turn.	6.50 to 7.00
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft.	16.50 to 17.00
Steel rails under 2 ft.	17.00 to 17.50
Angle bars, steel	16.00 to 16.50
Cast iron carwheels	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Agric. malleable	11.00 to 11.50
	Per Net Ton
Iron car axles	19.00 to 19.50
Steel car axles	19.50 to 20.00
Locomotive tires	16.50 to 17.00
Pipes and flues	9.50 to 10.00
No. 1 machinery cast.	13.00 to 13.50
Clean auto. cast.	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
No. 1 agric. cast	11.50 to 12.00
Stove plate	9.50 to 10.00
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
No. 2 hvy mltng. steel	13.50 to 14.00
Low phos. plate	14.50 to 15.00
No. 1 busheling	14.00 to 14.50
Hydraulic bundles	13.50 to 14.00
Machine shop turn.	9.50 to 10.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$12.50 to $13.00
No. 2 hvy. mltng. steel	11.50 to 12.00
Comp. sheet steel	12.00 to 12.50
Light bund. stampings	9.00 to 9.50
Drop forge flashings	10.00 to 10.50
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
Steel axle turnings	10.00 to 10.50
Low phos. billet and bloom crops	17.00 to 17.50
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
No. 2 busheling	8.00 to 8.50
No. 1 cast	16.50 to 17.00
Railroad grate bars	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	17.00 to 17.50
Rails for rolling	16.00 to 16.50
Railroad malleable	15.50 to 16.00
Cast iron carwheels	15.00 to 15.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	12.00 to 12.50
Scrap rails	15.00 to 15.50
New hvy. bndled sheets	12.00 to 12.50
Old hydraul. bundles	10.50 to 11.00
Drop forge flashings	12.00 to 12.50
No. 1 busheling	12.00 to 12.50
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	6.75 to 7.25
Knuckles & couplers	16.50 to 17.00
Coil & leaf springs	16.50 to 17.00
Rolled steel wheels	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	6.75 to 7.25
Mixed bor. & turn.	6.75 to 7.25
Cast iron borings	6.50 to 7.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast.	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels	13.50 to 14.00
Railroad malleable	14.50 to 15.00
Chemical borings	8.50 to 9.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$12.50 to $13.00
No. 1 hvy. melting	12.50 to 13.00
No. 2 hvy. melting	12.00 to 12.50
No. 1 locomotive tires	14.00 to 14.50
Misc. stand. sec. rails	14.00 to 14.50
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.	4.25 to 4.75
Machine shop turn.	4.25 to 4.75
Heavy turnings	8.00 to 8.50
Rails for rolling	16.50 to 17.00
Steel car axles	18.00 to 18.50
Iron car axles	19.50 to 20.00
No. 1 RR. wrought	11.50 to 12.00
No. 2 RR. wrought	12.50 to 13.00
Steel rails under 3 ft.	14.50 to 15.00
Steel angle bars	14.50 to 15.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast.	13.50 to 14.00
Railroad malleable	12.00 to 12.50
No. 1 railroad cast	10.50 to 11.00
Stove plate	8.50 to 9.00
Grate bars	8.50 to 9.00
Brake shoes	9.00 to 9.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$11.50 to $12.00
No. 2 hvy. mltng. steel	9.25 to 10.00
Scrap rails for mltng.	15.50 to 16.00
Loose sheet clippings	6.50 to 7.00
Hydrau. b'ndled sheets	10.50 to 11.00
Cast iron borings	3.50 to 4.00
Machine shop turn.	4.00 to 4.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	3.00 to 3.50
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires	14.25 to 14.75
Short rails	18.00 to 18.50
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast.	12.25 to 12.75
No. 1 railroad cast	11.25 to 11.75
Burnt cast	7.25 to 7.75
Stove plate	7.25 to 7.75
Agricul. malleable	11.75 to 12.25
Railroad malleable	14.75 to 15.25
Mixed hvy. cast	9.75 to 10.25

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$10.00 to $10.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Borings and turnings	6.00 to 6.50
Long turnings	6.00 to 6.50
Short shov. turnings	7.00 to 7.50
No. 1 machinery cast	11.50 to 12.00
Automotive cast	12.50 to 13.00
Hvy. breakable cast	9.00 to 9.50
Hydraul. comp. sheets	12.25 to 12.75
Stove plate	8.00 to 8.50
New factory bushel	11.50 to 12.00
Old No. 2 busheling	3.00 to 3.50
Sheet clippings	8.50 to 9.00
Flashings	9.00 to 9.50
Low phos. plate scrap	11.50 to 12.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$9.50 to $10.00
No. 2 hvy. mltng. steel	8.00 to 8.50
Hvy. breakable cast	11.00 to 11.50
No. 1 machinery cast	12.00 to 12.50
No. 2 cast	9.50 to 10.00
Stove plate	9.00 to 9.50
Steel car axles	20.00 to 20.50
Shafting	15.00 to 15.50
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	8.50 to 9.00
Rails for rolling	16.00 to 16.50
Clean steel turnings*	3.50 to 4.00
Cast borings*	3.00 to 3.50
No. 1 blast furnace	3.00 to 3.50
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	5.00 to 5.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	.... $10.15
Machine shop turn.	$3.38 to 4.50
Mixed bor. & turn.	.... 2.00
Bun. skeleton long	7.00 to 7.25
Shafting	14.50 to 14.65
Cast bor. chemical	5.50 to 5.75
Per gross ton delivered consumers' yards:	
Textile cast	$14.50 to $15.00
No. 1 machine cast	14.00 to 14.50

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$12.50 to $13.00
No. 2 hvy. mltng. steel	11.50 to 12.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel	$9.50	$9.00
No. 2 hvy. mltng. steel	8.00	7.50
Mixed dealers steel	7.00	6.50
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	3.50	3.00
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel	$11.00 to $11.50
No. 2 hvy. mltng. steel	9.50 to 10.00
No. 2 cast	10.00 to 11.00
Stove plate	9.00 to 10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	$12.50
No. 2 hvy. mltng. steel	11.50
Rails (scrap)	12.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

The above range in prices covers generally the spread between large and small jobs.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

PRICES F.O.B. UNLESS OTHERWISE NOTED

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown or Middletown	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.75c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland or Middletown	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.10c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage

Pittsburgh,, Gary Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

Black Plate

Pittsburgh	3.15c.
Gary	3.15c.
Granite City	3.25c.
On cars dock Pacific ports, boxed	4.10c.

NOTE: No. 29 gage is heaviest in which tin mill black plate is sold, No. 28 and heavier taking sheet base. There are no gages which take the above base prices as extras are applicable in all cases.

Tin Plate

	Per Base Box
Standard cokes, Pittsburgh and Gary	$5.35
Standard cokes, Granite City	5.45

Special Coated Manufacturing Ternes

	Per Base Box
Pittsburgh	$4.65
Gary	4.65
Granite City	4.75

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

HOT ROLLED STRIP

Prices F.o.b. Unless Otherwise Noted

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51- .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

*On galvanized wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Barbed wire, galvanized	3.20
Twisted barbless wire	3.20
Woven wire fence, base column.	67
Single loop bale ties, base col...	56

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	56	36	¼ & ⅜	.+ 9	+30
¼ to ⅜	..59	43½	½	24	6½
½	....63½	54	¾	30	13
¾	....66½	58	1 & 1¼	..34	19
1 to 3	..68½	60½	1½	38	21½
			2	....37½	21

Lap Weld

2	61	52½	2	....30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6	..66	57½	4	....33½	21
7 & 8	..65	55½	4½ to 8.32½		20
9 & 10	..64½	55	9 to 12	..28½	15
11 & 12	..63½	54			

Butt Weld, extra strong, plain ends

⅛	....54½	41½	¼ & ⅜	.+10	+43
½ to ⅜	..56½	45½	½	25	9
½	....61½	53½	¾	31	15
¾	....65½	57½	1 to 2	...38	22½
1 to 3	...67	60			

Lap Weld, extra strong, plain ends

2	59	51½	2	....33½	18½
2½ &	63	55½	2½ to 4.39		25½
3½ to	66½	59	4½ to 6.37½		24
7 &	8..65½	56	7 & 8	..38½	24½
9 &	10..64½	55	9 to 12	..32	20½
11 &	12..63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 3 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.79	10.23	9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
2 in. o.d....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d...12 B.W.G.	18.45	16.01	15.16
2½ in. o.d...12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d.... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d.... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2 000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts: ½ in. & 6 in. and smaller	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1⅛ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped: ½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	65, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carloads lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon units, U.S.S. and S.A.E.: ½ in. and smaller	60, 10 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	$3.40

Small Rivets

(17/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

(Freight allowed to destination)

	Per Cent Off List
Milled hexagon head cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	70 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67½ and 10
Upset set screws, cup and oval points	75 and 10
Milled studs	60½ and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½ Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth	£11
Beams, open-hearth	£10 12s. 6d.
Channels, open-hearth	£10 17s. 6d.
Angles, open-hearth	£10 12s. 6d.
Black sheets, No. 24 gage	£13
Galvanized sheets, No. 24 gage	£16 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 15s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$21.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	21.00
Delivered Brooklyn	23.50
Delivered Newark or Jersey City	22.53
Delivered Philadelphia	21.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown*	20.00
F.o.b. Buffalo	20.00
F.o.b. Detroit	20.00
Southern, delivered Cincinnati	20.06
Northern, delivered, Cincinnati	20.44
F.o.b. Duluth	20.50
F.o.b. Provo, Utah	22.00
Delivered, San Francisco, Los Angeles or Seattle	26.95
F.o.b. Birmingham*	16.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	20.50
F.o.b. Buffalo	19.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago and Youngstown	19.50
Delivered Philadelphia	21.34
Delivered Canton, Ohio	20.89
Delivered Mansfield, Ohio	21.44
F.o.b. Birmingham	15.00

Bessemer

F.o.b. Buffalo	$21.00
F.o.b. Everett, Mass.	22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	22.00
Delivered Newark or Jersey City	23.53
Erie, Pa., and Duluth	21.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	20.50
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.11
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. $25.50

Gray Forge

Valley or Pittsburgh furnace $19.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50% $29.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $23.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$2.00
Ferrotungsten, lots of 500 lbs. nominally	2.05
Ferrotungsten, smaller lots, nominally	2.10
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron. Nominally 17 to 18c.	
Iron, basic or foundry, Swedish, aver. 65% iron. Nominally 15c.	
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	35c.
Man., African, Indian, 44-48%	33c.
Man., African, Indian, 49-51%	35c.
Man., Brazilian, 46 to 48½%	33c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$20.00
Tungsten, domestic, scheelite delivered	$20.00 to 21.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	15.00
Rhodesian, 45%	19.50
Rhodesian, 48%	23.00
Turkish, 48-49%	23.50 to 24.50
Turkish, 45-46%	22.50
Turkish, 44%	18.00
Chrome concentrates (Turkish) c.i.f Atlantic Seaboard, per gross ton: 50%	24.50 to 25.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.	$18.00 to 19.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

No. 2 or diesel, f.o.b. Bayonne	4.00c.
No. 6, f.o.b. Bayonne	2.26c.
Del'd Chicago, No. 5 Bur. Stds.	3.25c.
Del'd Chicago, No. 6 Bur. Stds.	2.75c.
Del'd Cleve'd, No. 3 distillate	5.50c.
Del'd Cleve'd, No. 4 industrial	5.00c.
Del'd Cleve'd, No. 5 industrial	3.25c.
Del'd Cleve'd, No. 6 industrial	3.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

FABRICATED STEEL

. . . Lettings higher at 26,510 tons as against 21,600 tons last week . . . New projects decline to 23,100 tons from 41,200 tons a week ago.

NORTH ATLANTIC STATES

AWARDS

6725 Tons, Brooklyn, subway, section 9, route 110, to Bethlehem Steel Co., through George H. Flinn Corp., New York, general contractor.

1200 Tons, Newtown, Conn., State Hospital building, to Ingalls Iron Works Co., Birmingham.

765 Tons, Westmoreland County, Pa., viaduct and grade elimination bridge, to American Bridge Co., Pittsburgh.

750 Tons, Valley Falls, N. Y., State bridge over railroad, to Bethlehem Steel Co., Bethlehem, Pa.

740 Tons, Dundalk, Md., warehouse in Frankfort district, to Baltimore Steel Co., Baltimore.

550 Tons, New York, grade crossing elimination, Cross Bay Parkway, contract No. 6, to Bethlehem Steel Co., Bethlehem, Pa.

400 Tons, Medford, Mass., high school, to Bethlehem Steel Co., Bethlehem, Pa.

385 Tons, New York, World's Fair building for State of Florida, to Ingalls Iron Works Co., Birmingham.

260 Tons, New York, Worlds Fair building, Men's Quality Apparel Guild, to Ingalls Iron Works Co., Birmingham.

210 Tons, Washington, additional story wings two and three, Navy Building, to American Bridge Co., Pittsburgh.

150 Tons, New York, curb angles for Procurement Division, Treasury Department, to American Bridge Co., Pittsburgh.

135 Tons, Hillside, N. J., Mundet Cork Co., manufacturing building, to Breen Iron Works, Inc., Hillside.

130 Tons, New York, World's Fair building for Standard Brands, Inc., to Bethlehem Steel Co., Bethlehem, Pa.

125 Tons, Newark, N. J., transfer repair and control house, Public Service Electric & Gas Co., to Lehigh Structural Steel Co., Allentown, Pa.

THE SOUTH

1500 Tons, Houston, Tex., addition, Chamber of Commerce Building, to Mosher Steel Co., Houston.

325 Tons, Jax, Fla., docks and warehouses for Bull Line, to Aetna Iron & Steel Co., Jacksonville, Fla.

265 Tons, Louisville, Ky., Market Street underpass, to Louisville Bridge & Iron Co., Louisville.

CENTRAL STATES

1510 Tons, Madison, Wis., State office building, to Worden-Allen Co., Milwaukee, through J. H. Findorff Co.

1400 Tons, Cleveland, three bridges at Cloverleaf intersection, to Bethlehem Steel Co., Bethlehem, Pa., through Hunkin-Conkey Construction Co., Cleveland.

565 Tons, Kenosha, Wis., three Chicago & North Western Railroad subway structures, to Bethlehem Steel Co., Bethlehem, Pa., through Klug & Smith Co., Milwaukee.

510 Tons, La Porte, Ind., building for Allis-Chalmers Mfg. Co., to Joseph T. Ryerson & Son, Inc., Chicago.

400 Tons, Chicago, South Ashland Avenue improvement, to Bethlehem Steel Co., Bethlehem, Pa.

375 Tons, Chicago, Monroe Street viaduct, to American Bridge Co., through Kettler-Elliot Co.

255 Tons, Roxana, Ill., Madison County bridge, to Stupp Brothers Bridge & Iron Co., St. Louis.

245 Tons, Johnsburg, Ill., State bridge, to Midland Structural Steel Co., Cicero, Ill.

230 Tons, Fairmount City, Ill., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

180 Tons, Wyanet, Ill., bridge, to Worden-Allen Co., Milwaukee.

130 Tons, Alexis, Ill., bridge, to Wendnagel & Co., Chicago.

130 Tons, Oberlin, Ohio, college gymnasium, to Bethlehem Steel Co., Bethlehem, Pa., through John Gill & Sons Co., Cleveland.

112 Tons, Washington, Ind., bridge, to Central States Bridge & Structural Co., Indianapolis.

WESTERN STATES

1300 Tons, Lowry Field, Colo., hangar, to Bethlehem Steel Co.

500 Tons, Bremerton, Wash., storage building, Puget Sound Navy Yard, to Bethlehem Steel Co., Bethlehem, Pa.

340 Tons, San Diego, Cal., hangars Nos. 1 and 2, to Bethlehem Steel Co., Los Angeles.

221 Tons, Cloverdale, Cal., bridge, to Judson-Pacific Co.

200 Tons, Moorcroft, Wyo., State Bridge over Belle Fourche River, to Midwest Steel & Iron Works, Co., Denver.

172 Tons, Los Angeles, tunnel supports for city, to Truscon Steel Co., Los Angeles.

100 Tons, Coos County, Ore., Catching Slough bridge, to Mercer Steel Co., Portland, Ore., and Northwestern Equipment Co., Portland; J. W. and J. R. Hillstrom, Marshfield, Ore., general contractors.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

9000 Tons, Queens, N. Y., elevated highway and approaches, 45th to 64th Streets.

7000 Tons, Brooklyn, elevated highway and approaches, Meeker Avenue bridge; bids in.

500 Tons, Hartford, Conn., medical building, Rawlens Co.

300 Tons, Paterson, N. J., addition to assembly building, Wright Aeronautical Corp.

300 Tons, Kearny, N. J., alterations to high school.

300 Tons, Tioga County, N. Y., State highway bridge; bids in.

240 Tons, Goshen, N. Y., also 12 tons reinforcing bars, bridge and approach, project F.A.S., S.S. 38-29; bids Sept. 27.

200 Tons, Wyomissing, Pa., high school; bids Sept. 10.

200 Tons, Boston, skating rink, Boston Skating Club.

135 Tons, Philadelphia, State highway bridge.

125 Tons, New Rochelle, N. Y., refuse incinerating plant.

106 Tons, Chemung, N. Y., also 12 tons reinforcing bars, bridge and approach, project F.A.S., S.S. 38-30; bids Sept. 27.

102 Tons, Bemus Point, N. Y., also 29 tons reinforcing bars, highway project R.C. 3987; bids Sept. 27.

100 Tons, Lockport, N. Y., addition to Lockport Hospital; bids Sept. 9.

100 Tons, Buffalo, Kresge store; bids Sept. 12.

100 Tons, Yeadon, Pa., addition to high school; bids Sept. 12.

100 Tons, Wayne, Pa., gymnasium; bids this week.

100 Tons, Athol, Mass., bridge.

CENTRAL STATES

1000 Tons, Minneapolis, Minn., water softening plant at Fridley.

700 Tons, Oberlin, Ohio, college auditorium; bids Sept. 9.

600 Tons, Detroit, Montgomery Ward store.

250 Tons, Danville, Ill., railroad coach shop; bids Sept. 15.

250 Tons, Belleville, Ill., warehouses at Scott Field; Smith-Cooke Construction Co., St. Louis, low bidder on general contract.

155 Tons, Appleton, Wis., overhead B 464; bids Sept. 13.

100 Tons, Chippewa Falls, Wis., bridge B 497; bids Sept. 13.

105 Tons, Gillett, Wis., bridge 458; bids Sept. 13.

WESTERN STATES

319 Tons, Kennett, Cal., tunnel supports for railroad relocation (Invitation 796); bids Sept. 21.

165 Tons, Strasburg, Colo., State bridge, project FAP-351-E.

150 Tons, Kremmling, Colo., tunnel supports for Green Mountain Dam (Invitation 797); bids Oct. 12.

150 Tons, Leavenworth, Wash., fish hatchery, Columbian Basin project, U. S. Govt.

115 Tons, Lowry Field, Colo., warehouse building.

HAWAII

510 Tons, Port Allen, T. H., wharf and terminal improvements, including 110 tons rails.

FABRICATED PLATES

AWARDS

120 Tons, Gilbertsville, Ky., two tanks for TVA, to Chicago Bridge & Iron Works, Chicago.

NEW PROJECTS

250 Tons, Kremmling, Colo., tunnel liner plates for Green Mountain Dam (Invitation 797); bids Oct. 12.

SHEET PILING

AWARDS

3000 Tons, Chicago, North Avenue piers and jetties, to Carnegie-Illinois Steel Corp., Pittsburgh, through Fitzsimons & Connell Dredge & Dock Co.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Export business still prominent . . . Domestic buying expected to improve during fall.

Detroit Expects Canada to Buy More Machine Tools

DETROIT—There is considerable Canadian business still to be placed along the Border. Late last week the British High Commissioner to Canada, Sir Francis Floud, announced that two large aircraft manufacturing plants would be erected in Canada to furnish war planes for Great Britain. At first the units will serve only as assembly plants, with motors imported from Great Britain and United States, but later it is planned to develop the plants into complete factories, with planes to be flown to Great Britain upon completion. Two groups of Canadian firms are to back the factories. One at St. Hubert near Montreal is to be built by Canadian Vickers, Ltd., Canadian Car & Foundry, Ltd., and Fairchild, Ltd. The other will be built at Malton Airport, Toronto, by National Steel Car Corp., Fleet Aircraft, Ltd., and Ottawa, Ltd. It has been learned that manufacture of Ford hydraulic brakes will not require a great deal of equipment for the plants mentioned here a week ago.

Cleveland Machine Tool Trade Looks for Fall Improvement

CLEVELAND—Manufacturers are assured an active September through comfortable backlogs which consist mostly of foreign business. A large shipment of lathes is nearing completion for Russia from this district, and order books contain considerable work for Japan and England. Inquiries from Sweden, France, Finland, Holland and other countries are active. On the domestic side, business has been spotty, partly due in this district to the comparative inactivity of the automobile industry, but hopes are confidently held that the situation will be progressively better over the coming months.

A new Cleveland company in the plastics industry, International Molded Plastics, Inc., is reported to have purchased recently $40,000 worth of new machinery, including several thousand dollars in tools and dies.

Export Business Still Large Part of Cincinnati Orders

CINCINNATI—The final week of August brought an upturn in local machinery business. Small tools are most prominent in current business, although planer and boring mill manufacturers report relatively no change in their orders during August. Analysis of the past week's business indicates a slight gain in domestic interest, which might be taken as a harbinger of the anticipated upward movement this fall. Export business is still a large portion of present activity.

Mixed Results in Chicago Machinery Trade in August

CHICAGO—Market conditions here are spotty. Sales agency reports vary considerably, some terming August practically a dead loss, even in small tools, while others indicate a 40 per cent gain over July, and good prospects for September. Apparently there is no explanation for this except the ovious fact that some are getting business and some are not. A few of the farm equipment builders are buying, but the railroads and steel mills are inactive. General manufacturing plants and miscellaneous sources are responsible for most of the buying.

August Sales in New York Fully 10% Ahead of July's

NEW YORK—Although small tool purchases were well up to the level of the previous week, there was a slight let-down in general business activity in the past week, which sellers attribute to the holiday. Inquiries, particularly, were in smaller volume. A few small pieces were bought for the Brooklyn Navy Yard. These purchases, however, represent only a minute portion of the yard's approved buying program. No new industrial lists are out for figuring, but a number of such lists are expected shortly. The Japanese situation is still confused, although it is expected that soon sufficient credits will be arranged to cover the purchase of the equipment the Japanese are interested in. The volume of sales in August was, on the average, 10 per cent above July.

Pickets Block Returning Greer Steel Workers

CLEVELAND.—Although a majority of employees favored acceptance of a 12.5 per cent wage reduction and a return to work, a picket line was thrown around the plant of the Greer Steel Co., in Dover, Ohio, on Sept. 7, at the instigation of union leaders. Company officials charged that coal miners and other outsiders had been brought in to help prevent the reopening of the plant, which remained closed.

In a recent letter, the company offered to reopen the plant and reemploy the men as speedily as business permitted, provided the men accepted the 12.5 per cent wage cut. The plant has been closed since June 30.

NLRB Certifies CIO's Aluminum Workers

WASHINGTON.—The National Labor Relations Board has certified the International Union, Aluminum Workers of America, Local No. 11 (CIO), as exclusive representative of the production and maintenance employees of the Aluminum Co. of America at its Detroit plant. Board action was based on an Aug. 9 election in which the CIO union polled 344 votes, with 100 cast against it.

Keystone Steel Has Profit of $727,543

KEYSTONE STEEL & WIRE CO., Peoria, Ill., reports for the fiscal year ended June 30, 1938, net profit of $727,543 after all charges, compared with $1,160,857 for the preceding 12 months. Net sales totaled $9,648,838 against $12,163,666.

U. S. $2,611,000 Generator Order to Westinghouse

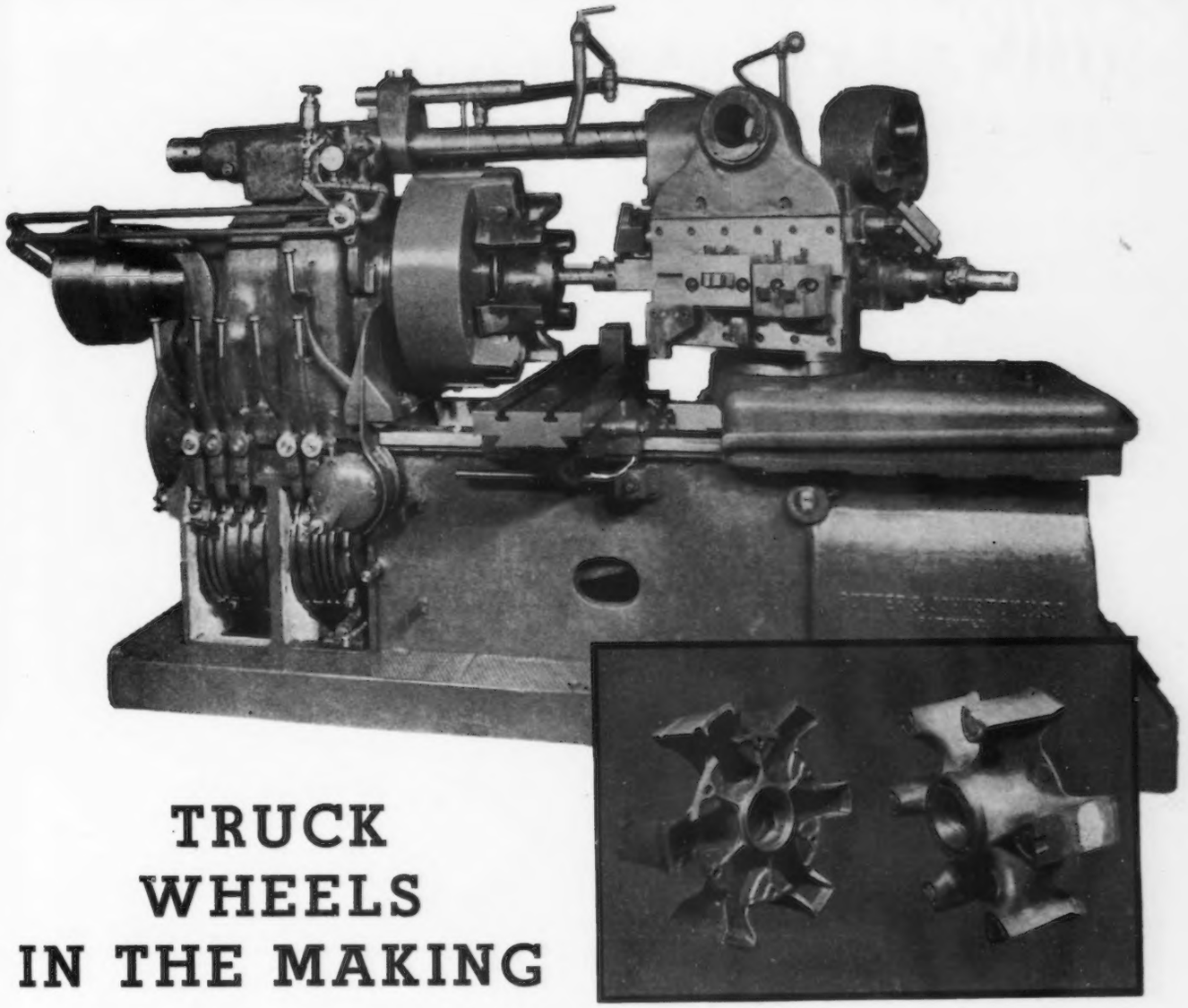
WASHINGTON.—The Interior Department has awarded a contract for three electric power generators to the Westinghouse Electric & Mfg. Co. for $2,611,000 for building and installation in the power house at Grand Coulee dam, Washington state.

Armco Loss for 12 Months Is $537,191

AMERICAN ROLLING MILL CO. reports for the 12 months ended July 31, 1938, a net loss of $537,191. The period covered by the company's earnings statement began after the effective date of July 11, 1937, of the company's SEC registration statement covering issuance and sale of 450,000 shares of preferred stock.

Arthur G. McKee Pays Regular 25c. Dividend

CLEVELAND.—Directors of Arthur G. McKee Co. at a meeting Sept. 7 voted the regular 25c. dividend on the class B stock and a 75c. extra dividend, payable Oct. 1 to holders of record Sept. 20. With this $1 dividend the company will have paid $4 per share so far this year, compared with $3.75 in the corresponding period last year.



TRUCK WHEELS IN THE MAKING

Broken cuts present one of the main problems to be solved in the economical machining of Truck Wheels. This pertains to the larger diameters and it is most essential that the bearing bores in the hub be accurate and in perfect alignment. To meet these strict requirements, the wheels must be properly chucked.

The fixture for the second holding is a vital factor. All tools (tungsten carbide) must be correctly piloted and the turret and cross slide tools well mounted on an exceptionally rigid machine.

Working with customers' production departments, Potter & Johnston engineers solved these problems, but the P & J model 6-DRE Automatic Chucking and Turning Machine made possible the successful application of their solutions.

Have you a problem? P & J engineers will gladly cooperate with you to attain a satisfactory answer.

POTTER & JOHNSTON MACHINE CO.

PAWTUCKET, R. I.

FACTORY REPRESENTATIVES:

J. Potter Cunningham Headquarters at Factory: New England States and Eastern New York & New Jersey: A. W. Stone, 986 Kenyon Ave., Plainfield, N. J.; Western New York & New Jersey, Eastern Pennsylvania, Maryland and Delaware; G. Tell DuBois, 8-154 General Motors Building, Detroit, Michigan; Michigan and the City of Toledo, Ohio; Louis K. Voelk, 14014 Woodworth Road, East Cleveland, Ohio; Ohio —with the exception of Toledo, and Western Pennsylvania: Harry I. Schuster, 743 North Fourth Street, Milwaukee, Wisconsin; Illinois, Missouri, Wisconsin, Iowa and Indiana: **AGENCIES:** Star Machinery Company, 1741 First St., South, Seattle, Washington; Henes-Morgan Machinery Co., 2026 Santa Fe Ave., Los Angeles, Calif.; Jenison Machinery Co., 20th & Tennessee Sts., San Francisco; Wessendorff, Nelms & Co., Inc., 317 Preston Ave., Houston, Texas; Arthur Jackson Machine Tool Co., 60 Front Street West, Toronto 2, Ontario, Canada; Arthur Jackson Machine Tool Co., 437 Grosvenor Ave., Montreal, Canada; Burton, Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France; Rotterdam, Holland; and Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Vaghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan (Imperial Export Co., 44 Whitehall St., New York, N. Y.); Almacos, Zurich, Switzerland; Be-Te-Ha, Warschau, Poland; Schuchardt et Schutte, Budapest, Hungary; Bourla Freres, Istanbul, Turkey.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

International Business Machines Corp., 590 Madison Avenue, New York, computing and recording machines, parts, etc., will take bids soon on general contract for three-story addition, 160 x 450 ft., to main plant at Endicott, N. Y. Cost over $500,000 with equipment. J. M. Demerest is company engineer.

United States Tobacco Co., 630 Fifth Avenue, New York, has plans for new power house at branch plant in Nashville, Tenn. Cost close to $135,000 with equipment.

Department of Docks, Pier A, North River, New York, will begin superstructure soon for two hangars, each about 165 x 350 ft., with repair and reconditioning facilities, at new municipal airport, North Beach, Queens Borough. Cost close to $1,000,000 each with equipment. Plans also are under way for three additional hangars, about like size and cost, for land planes, on which work is scheduled to begin before close of year. Financing has been arranged through Federal aid. Entire airport will represent investment of about $20,000,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 13 for putty-mixing and kneading machine (Schedule 4297) for Brooklyn Navy Yard; until Sept. 20, eight feed water heaters and deaerating equipment and spare parts (Schedule 4322) for Brooklyn and Philadelphia yards.

Rockland Light & Power Co., Nyack, N. Y., has approved plans for new hydroelectric power plant near Port Jervis, N. Y., and will begin work soon. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

Welrods Corp., recently organized subsidiary of Air Reduction Co., 60 East Forty-second Street, New York, to specialize in production of welding wire, has let general contract to Consolidated Engineering Corp., 20 East Franklin Street, Baltimore, for two-story factory branch, storage and distributing plant in Sparrows Point district, Baltimore. Cost close to $50,000 with equipment.

Signal Officer, Second Corps Area, Governors Island, New York, asks bids until Sept. 26 for one cable reel trailer, one electric hammer, one cement mixer and one self-priming centrifugal pump (Circular 1).

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, plans rebuilding of part of oil refinery at Paulsboro, N. J., including one-story building, 30 x 250 ft., for oil separating service, recently destroyed by fire. Loss close to $500,000 with distilling machinery and other equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Sept. 21 for extension to drydock at Brooklyn Navy Yard. (Specifications 8668); also bids (no closing date stated) for two 350-ton hammerhead cranes, for installation at Brooklyn and Norfolk yards, respectively (Schedule 8979).

Quartermaster Supply Officer, Army Base, Firty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 26 for galvanized iron roofing, galvanized iron ridge roll, galvanized iron roofing nails, etc. (Circular 626-49).

Mundet Cork Corp., 501 Bloy Street, Hillside, N. J., insulation products, etc., has let general contract to White Construction Co., 95 Madison Avenue, New York, for one-story addition, 100 x 324 ft. Cost about $100,000 with equipment. Main offices of company are at 65 South Eleventh Street, Brooklyn.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Sept. 12 for one reversible tripping blade snow plow, and two V-type pilot snow plows with center flanger between track (Circular 176); until Sept. 13, one air compressor (Circular 167); until Sept. 15, 75,000 thumb nuts and 75,000 screw hooks (Circular 126), one air drill with motor (Circular 170).

Pressed Steel Co., 705 North Penn Avenue, Wilkes-Barre, Pa., manufacturer of stampings, steel rings and kindred products, has let general contract to W. B. Richards, Wilkes-Barre, for one-story addition, 30 x 125 ft. Cost over $60,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Sept. 12 for 30 tool stands for small lathes, storage cabinets, etc. (Circular 165).

Crown Metal Mfg. Co., New York, recently organized, has leased space in building at 67 Irving Place for manufacture of metal furniture and tubular products. I. Rappaport is president and A. H. Rappaport, secretary and treasurer.

NEW ENGLAND

Worcester Street Railway Co., Worcester, Mass., Howard R. Whitney, manager, has plans for motor bus service, repair and garage building, 105 x 145 ft., at Park Avenue and Sagamore Road. Erection will be carried out by company forces. Cost over $75,000 with equipment. Lewis E. Moore, 73 Tremont Street, Boston, is consulting engineer.

Electrolux, Inc., Forest Avenue, Greenwich, Conn., manufacturer of vacuum cleaning machines and parts, has let general contract to John L. Duge & Sons, 81 Railroad Avenue, for one-story addition. Cost close to $50,000 with equipment. Executive offices are at 500 Fifth Avenue, New York.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Sept. 13 for stranded rubber-covered cable (Circular 51); until Sept. 23, one spinning-type riveting machine and equipment (Circular 45); until Sept. 29, one contour measuring projector, inclosed type (Circular 51).

Raybestos-Manhattan, Inc., Bostwick Avenue, Bridgeport, Conn., manufacturer of brake lining, mechanical rubber goods, etc., has plans for four one-story additions to branch plant at Stratford, Conn. Cost close to $90,000 with equipment.

Board of School Trustees, Hudson, Mass., plans vocational department in new multi-story addition to high school. Cost about $300,000. Financing has been arranged through Federal aid. Earl V. Aldrich, 46 Lincoln Street, is architect.

WASHINGTON DIST.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for watertube boilers with air or water-cooled settings, stokers or pulverized coal burners, draft fans, pumps, heater, tank, continuous blow-down, combustion control, coal-handling machinery, ash and soot removal equipment, fly-ash eliminators, track hopper, piping and auxiliary equipment for power house at Naval Academy, Annapolis, Md. (Specifications 8915); also bids (no closing date stated) for one-story storage building at same place, with steel rolling doors, hollow metal doors, corrugated steel roofing, etc. (Specifications 8885).

Charles E. Brandt, Inc., Bush and Ridgely Streets, Baltimore, manufacturer of metal specialties, has asked bids on general contract for one-story addition. Cost close to $45,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 16 for 100,000 lin. ft. of telephone wire, 15,000 ft. of copper stove wire, 20,000 ft. of rubber-insulated copper wire, 17,300 ft. of copper cable, 2650 lb. of magnet wire, ungalvanized pipe fittings, pipe flanges, gate valves, unions, railing fittings, steam traps and other equipment (Specifications 3379).

Hunter Baltimore Rye Distillery, Inc., 1900 East Fort Avenue, Baltimore, has let general contract to George H. Dashiells & Sons Co., 223 East Twenty-third Street, for new steam power house and pumping station. Cost over $60,000 with equipment. Moehle & Associates, 217 West Franklin Street, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 13 for motor truck with cab and equipment, crane mounted on tractor truck, and semi-trailer with device for attaching to tractor truck (Schedule 4295) for Quantico, Va.; until Sept. 16, spare parts for airplanes (Schedule 900-2022) for Eastern or Western navy yard; until Sept. 23, motor-driven centrifugal pumps (Schedule 4302) for Boston, Charleston and Puget Sound Navy Yards.

BUFFALO DISTRICT

Church & Dwight Co., Inc., 1416 Willis Avenue, Syracuse, N. Y., manufacturer of bicarbonate of soda and allied products, and Solvay Process Co., Solvay, Syracuse, producer of raw materials for such manufacture, have let general contract to Austin Co., Cleveland, for new multi-story plant unit. Cost about $2,500,000 with machinery. A. C. Schroeder is plant manager of first noted company.

Chevrolet Mfg. Division, General Motors Corp., Tonawanda, N. Y., is carrying out expansion at local assembly works and will install additional equipment for production of motor truck axles, a new division of manufacture for local plant, heretofore confined to axles for passenger cars, in addition to other parts production.

SOUTH ATLANTIC

Orangeburg-Aiken Hydro-Electric Commission, Orangeburg, S. C., James M. Green, chairman, plans hydroelectric power development on Edisto River, near Orangeburg, including power dam, generating station, power substations and switching stations, transmission lines and other operating structures. Cost over $1,500,000. Financing will be arranged through Federal aid. Daniel T. Duncan, Ninety-Six, Greenwood County, S. C., is consulting engineer.

United States Coast Guard Headquarters, Washington, asks bids until Sept. 12 for one double-acting pumping unit with accessories (Circular CG3496) for Savannah, Ga.

Columbia Naval Stores Co., Savannah, Ga., has approved plans for new distillation plant unit, to include two 25-bbl. stills and auxiliary equipment, with storage and distributing facilities. Cost over $45,000 with equipment.

SOUTH CENTRAL

District Quartermaster, District D, CCC, Fort McClellan, Ala., asks bids until Sept. 12 for 10 vertical spindle shapers, two belt and disk surfacers, band saw, two bench saws, band saw and jig saw, fractional horsepower motors and other equipment (Circular 5405-8).

Sherman Concrete Pipe Co., Montgomery, Ala., has approved plans for branch plant at 3420 Fayette Avenue, Birmingham, for production of cast pipe sections from 4 to 108 in. in dia. Cost over $40,000 with equipment.

United States Engineer Office, Second District, New Orleans, asks bids until Sept. 16 for two diesel engine units, propelling marine type, heavy duty, with accessories and spare parts (Circular 74).

Board of Trustees, State Industrial College, Frankfort, Ky., plans steam power house, including boilers and accessories, stokers, coal bunker and other equipment. Fund of $291,000 is being arranged for this and other buildings, of which $131,175 will be a Federal grant. Leo L. Oberwarth & Son, Frankfort, are architects.

United States Engineer Office, Vicksburg, Miss., asks bids until Sept. 12 for one gaso-

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line engine-driven crawler-type dragline excavating machine (Circular 39).

WESTERN PA. DIST.

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans one-story addition at branch plant, Sharon, Pa., for storage and distribution. Cost over $100,000 with equipment.

Board of Education, 221 Twelfth Street, Homestead, Pa., plans manual training department in new two-story and basement senior-junior high school. Cost about $565,000, of which $255,600 is being secured through Federal grant. Lamont H. Button and Paul F. McLean, 119 East Montgomery Street, Pittsburgh, are architects.

Board of Allegheny County Commissioners, City-County Building, Pittsburgh, plans one-story repair, service and maintenance building for county highway equipment at Versailles, Pa., with storage and distributing facilities. Cost about $100,000 with equipment. Financing is being arranged through Federal aid.

OHIO AND INDIANA

Cincinnati Milling Machine Co., Cincinnati, will begin superstructure soon for one-story addition, 90 x 269 ft., for storage and distribution, for which contract recently was let to Austin Co., Cleveland. Cost over $60,000 with equipment.

Board of Trustees, Miami University, Oxford, Ohio, asks bids until Sept. 12 for addition to power plant, including remodeling of present station. Cost about $75,000 with equipment. Fosdick & Hilmer, Union Trust Building, Cincinnati, are consulting engineers.

Board of Education, Marion, Ohio, plans manual training department in new three-story and basement high school, for which bids will be asked soon on general contract. Cost about $750,000, of which $337,000 will be a Federal grant. T. D. McLaughlin, Dominion Building, Lima, Ohio, is architect.

Fremont Flask Co., Fremont, Ohio, recently organized to manufacture foundry flasks, jackets for molds and other foundry equipment, has taken over former plant of H. L. Baumgardner Co., for works. C. W. Yeadon is head.

Board of Education, Chillicothe, Ohio, plans one-story industrial arts building at local school. Cost close to $40,000. Bond issue has been voted. Claude Youst, 55 East State Street, Columbus, Ohio, is architect.

Pak-Age-Car Corp., Connersville, Ind., has been organized as a wholly-owned subsidiary of Auburn Automobile Co., Auburn, Ind., to specialize in production of a line of delivery cars, originated by Stutz Motor Car Co., Indianapolis, defunct. New company will occupy part of branch plant of parent organization at Connersville for parts production and assembling. Manufacture is scheduled to begin late in October.

Stokely Brothers & Co., 2002 South East Street, Indianapolis, food canners and packers, have leased a five-story building, totaling 250,000 sq. ft. of floor space, of former plant of Marmon Motor Car Co., and will remodel for expansion in storage and distributing division.

MICHIGAN DISTRICT

Sutherland Paper Co., Kalamazoo, Mich., manufacturer of coated news and other paper stocks, plans one-story addition for production of paperboard products. Cost close to $175,000 with machinery.

Harold D. Smith, 213 State Office Building, Lansing, Mich., State budget director, asks bids until Sept. 13 for steam-electric power plant at Newberry, Mich., including turbo-generator units, boilers, stokers, heaters, pumps, coal and ash-handling machinery, switchgear, transformers, conduit, piping, electric crane and auxiliary equipment. Cost about $348,000. Derrick Hubert, 1065 Sheridan Road, Menominee, Mich., is architect. E. R. Little Co., Inc., Ford Building, is consulting engineer.

Transport Refrigeration Co., Hollister Building, Lansing, Mich., recently organized with capital of $150,000, plans establishment of local plant for production of a dry-ice refrigeration unit for use in insulated truck bodies, railroad cars, etc.

City Council, Holland, Mich., plans new municipal electric power plant. Cost about $1,500,000 with turbo-generators and accessories, boilers and auxiliary equipment. Financing will be arranged through Federal aid. Hamilton & Weeber, Grand Rapids, Mich., are consulting engineers.

SOUTHWEST

City Council, Blackwell, Okla., asks bids until Sept. 20 for boiler feed pumps and accessories, air compressor, evaporating system, generator air ducts, piping, etc., for municipal electric power plant. Cost about $207,000. Financing has been arranged through Federal aid. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Barnsdall Refining Corp., Tulsa, Okla., plans rebuilding part of gasoline refinery at Odessa, Tex., recently destroyed by fire. Loss over $250,000 with equipment.

Board of Education, Library Building, Kansas City, Mo., George C. Tinker, secretary, asks bids on general contract until Sept. 13 for two, three and four-story and basement addition to manual training high school at Fifteenth Street and Forest Avenue. Cost about $580,000 with equipment. Financing has been arranged. Charles A. Smith and Nate W. Downs, both Finance Building, are architect and engineer, respectively.

Purchasing and Contracting Officer, Quartermaster Corps, Fort Riley, Kan., asks bids until Sept. 13 for 1600 lin. ft. of truck chain (Circular 735-8).

Midwest Smokeless Fuel Corp., St. Louis, recently organized, care of R. S. Smith, head, Smith, Moore & Co., 509 Olive Street, investments, plans new coal processing plant at East St. Louis, Ill., where site has been acquired. It will comprise units for carbonizing oven division, mechanical-washing department, storage and distribution, etc. Cost close to $1,000,000 with machinery. Company is securing RFC loan of about one-half that sum as part of financing.

Lower Colorado River Authority, Littlefield Building, Austin, Texas, Fritz Englehard, chairman of board, asks bids until Sept. 15 for one 40-ton electric overhead traveling crane for Austin power plant.

MIDDLE WEST

Skilsaw, Inc., 3310 North Elston Avenue, Chicago, manufacturer of portable electric-operated saws, etc., has let general contract to Austin Co., 510 North Dearborn Street, for one and two-story plant, 160 x 460 ft., at Elston and Winnemac Avenues. Cost about $125,000 with equipment. Present plant will be removed to new location and capacity increased.

Constructing Quartermaster, Scott Field, Ill., asks bids until Sept. 16 for two-story quartermaster warehouse (Circular 6626-25).

Board of Education, Colorado Springs, Colo., plans manual training department in new two-story and basement high school. Cost about $325,000. Financing is being arranged through Federal aid and bond issue. Burnham L. Hoyt, Colorado National Bank Building, Denver, is consulting architect; Edward L. Bunts, First National Bank Building, Colorado Springs, is associate architect.

Construction Officer, Indian Service, Fort Berthold Agency, Elbowwoods, N. D., asks bids until Sept. 12 for elevated steel tank and tower for water storage.

City Council, Stewartsville, Minn., plans new municipal electric power plant. Cost about $120,000. Financing will be arranged through Federal aid. Burlingame, Hitchcock & Eastabrook, Sexton Building, Minneapolis, are consulting engineers.

Froedtert Grain & Malting Co., Inc., West Grant Street, Milwaukee, has plans for addition to grain elevators at Winona, Minn. Cost close to $75,000 with elevating, screening and other equipment. Barnett & Record Co., Flour Exchange Building, Minneapolis, is consulting engineer.

City Council, David City, Neb., plans addition to municipal electric power plant, including equipment. Cost about $65,000. Scott & Scott, Bankers' Life Building, Lincoln, Neb., are consulting engineers.

Grant County Board, Lancaster, Wis., has appropriated $44,000 toward construction and equipment of an $80,000 highway garage and service building as a PWA project. Eugene Croft is County highway commissioner.

Van Brunt Mfg. Co., Horicon, Wis., has plans for alterations and additions to its farm implement factories. O. A. Eckerman, Moline, Ill., is architect.

A. E. White Machine Co., 750 Wisconsin Street, Eua Claire, Wis., has awarded general contract to Hoeppner-Bartlett Co., local, for addition to factory.

PACIFIC COAST

Dwight Edwards Co., 255 Twelfth Street, San Francisco, coffee and food products, has asked bids on general contract for new three-story plant, 100 x 200 ft., at Mariposa and Arkansas Streets. Cost close to $200,000 with equipment. Jesse Rosenwald, 525 Market Street, is consulting engineer.

City Council, Pasadena, Cal., plans new municipal shop, garage and equipment storage and distributing building on Glen Avenue, 36 x 296 ft., 36 x 207 ft., and 36 x 125 ft., respectively, for engineering, and street and highway departments. Cost over $75,000 with equipment. Financing is being arranged in part through Federal aid. Breo Freeman, Security Building, is architect.

Bureau of Reclamation, Denver, asks bids until Sept. 14 for five radial gates and five radial gate hoists for Black Canyon Canal and D Line Canal, Payette Division, Boise Project, Idaho. (Specifications 1116-D).

J. D. Ross, administrator, Bonneville Project, Failing Building, Portland, asks bids until Sept. 20 for transmission line wire and cable, and appurtenances (Circular 44); until Sept. 22 for transmission line wire and cable, and appurtenances (Circular 45), transmission line wire and cable and appurtenances for Vancouver-Kelso, Wash., 230-kv. power line (Circular 46); until Sept. 23 for steel towers and appurtenances for Vancouver-Kelso, Wash., transmission line (Circular 43).

Puente Union High School District, Puente, Cal., has let general contract to S. Giannone, 2137 Vallejo Street, Los Angeles, for one-story addition to high school, 70 x 140 ft., for a vocational shop. Cost about $40,000 exclusive of equipment. Samuel E. Lunden, Rowan Building, Los Angeles, is architect. Financing has been arranged through Federal aid.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 16 for one motor tractor truck and one semi-trailer (Schedule 4288) for San Diego Naval Air Station.

Butler Packing Co., Seattle, food products, plans new one-story canning and packing plant on Marginal Way. Cost about $15,000 with equipment. Sutton, Whitney & Dugan, Rust Building, Tacoma, Wash., are architects; Putnam Engineering Co., Provident Building, Tacoma, is consulting engineer.

Los Angeles Harbor Commission, 638 Beacon Street, San Pedro, Los Angeles, plans new one-story mechanical shop at Berth 161, Los Angeles Harbor. Cost close to $50,000 with equipment. Financing is being arranged through Federal aid.

FOREIGN

National Oil Fields Department of Argentina, Buenos Aires, Argentine Republic, a Federal agency, has acquired plant and properties of Itaca Petroleum Co., Ltd., in Rosario oil field area, and plans expansion in oil refining plant and crude oil production facilities, storage and distributing, pipe lines and other properties. Cost over $500,000.

Argo Oil Co., Ltd., Industrial Street, Leaside, Ont., plans new oil refining plant, comprising several large units, with steel tank storage and distributing division and other departments. Cost close to $400,000.